AD-A096 385 NAVAL POSTGRADUATE SCHOOL MONTEREY CA F/6 8/10

NUTRIENT STUDY OF MESOSCALE THERMAL FEATURES OFF POINT SUR, CAL--ETC(U)

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The predictive regression equation computed from 333 *in situ* measurements was compared with the equations developed using the slope derived from source water characteristics and the temperature of the ocean water used as the T-intercept. The nitrate concentrations for 11.85° and 14.0°C were computed.

The best fit linear regression (correlation, $r = -0.93$) based on underway *in situ* measurements was:

$$N = -3.24\,T + 47.74.$$

where $N = \mu M$ nitrate and $T = °C$ temperature. The predictive regression equation, assuming no thermal exchange with the environment, was:

$$N_1 = -3.7\,T + 57.35$$

The second approximation which corrected for wind mixing and atmospheric thermal exchange was:

$$N_2 = -3.1\,T + 48.05$$

a. Comparison of Predicted Nitrate Concentration to That Computed by Regression Analysis of Observed Data

The solution to the equations are as follows: for T_c of 11.85°C, $N = 9.82$ µM, $N_1 = 13.5$ µM, and $N_2 = 11.3$ µM nitrate; for T_f of 14.0°C, $N = 2.94$ µM, $N_1 = 5.5$ µM, and $N_2 = 4.7$ µM nitrate. The percentage of error ($\frac{N_1 - N}{N} \times 100$ and $\frac{N_2 - N}{N} \times 100$), associated in predicting the nitrate concentration at the cold center or most recently upwelled water appears to be *ca.* +37% for the first approximation,

N_1, and _ca_. +15% for N_2 which accounted for wind mixing and thermal exchange. In the vicinity of the ocean front, the percentage of error increased; for T_f of 14.0°C, N_1 had an error of _ca_. +98% whereas N_2 had an error of _ca_. +58%. In both hindcasts the nutrient concentrations predicted were higher than those computed from the equation based on _in situ_ surface measurements. Both hindcasts also deteriorated in reliability proceeding away from the cold center of the feature. The predictive equation which corrected for wind mixing and thermal exchange with the atmosphere had significantly less error than the equation that did not. Because nitrate and temperature are nonconservative within the upper layer of the ocean, the 15% error derived from linear regression should be considered reasonable. In all, the longer the upwelled water is in contact with the surface layer of the ocean, the more complex the interactions with the physical and biological environment may become, and the more unrealistic the simple predictive equations.

b. Summary of Conditions for Which This Test Appeared Satisfactory

This hindcast was applied only to a shallow upwelling system which satellite history showed to be in an initial stage of development. The prediction was based on knowledge of the temperature of the sea surface within the coldest thermal pattern detected, surface temperature of the oceanic front detected by thermal patterns, a vertical

temperature and nutrient profile within the upper 200m of the ocean seaward of the oceanic front, and atmospheric parameters to hindcast ocean-atmosphere thermal exchange [James, 1966]. In this special case, given this limited ground truth, it was possible to hindcast within 15% error the *maximum nutrient concentration* in an upwelling system detected by satellite imagery. It therefore seems reasonable to assume that at least the major patterns of nutrient distributions can, with further research, be inferred using satellite imagery and limited ground truth (i.e., data from buoys and AXBT's).

V. CONCLUSIONS

1. Inference of nutrient distribution by satellite detected upwelling systems is feasible.

2. Active upwelling systems are expected to have strong inverse linear correlations between nutrients and temperature.

3. The nutrient front position can be approximated closely by the thermal oceanic front.

4. The nutrient distribution within a feature can not be related to the sharpness of the thermal front.

5. To predict nutrient distributions, ground truth as well as satellite detected thermal patterns are required.

6. A linear regression can be used to forecast nutrient maxima for upwelling systems in the initial stage of development aided by only limited *in situ* data.

7. The approximation of nutrient concentrations by linear regression can be improved by estimating the effects of wind mixing and thermal exchange with the atmosphere.

8. With greater knowledge of source water characteristics (from *in situ* monitoring or historical data), stage of development (inferred from satellite images and *in situ* monitoring), and dynamic processes (wind mixing, advection, and heat transfer) a forecast of nutrient distributions with a surface thermal feature could be made.

APPENDIX A

Listing of Surface Data: Time, Latitude, Longitude, Elapsed Distance, Nitrate, Phosphate, Nutrient Ratio, ATP, ΔATP/ATP, Chlorophyll, Temperature

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
0224	36 16.9	122 5.9	0.6	1.08				0.93	15.95
			1.2	0.93				0.92	16.05
			1.8	0.85				0.89	16.10
			2.4	0.77			247.0	0.89	16.15
			3.1	0.63				0.84	16.20
			3.7	0.49				0.70	16.20
			4.3	0.45				0.82	16.25
			4.9	0.45				0.74	16.30
			5.5	0.41				0.69	16.30
			6.1	0.45	0.50	0.8		0.68	16.25
			6.7	0.41	0.54	0.9		0.67	16.25
			7.3	0.45	0.53	0.8		0.66	16.25
			7.9	0.53	0.53	1.0		0.70	16.25
			8.6	0.61	0.53	1.2		0.86	16.20
			9.2	0.65	0.53	1.2		0.65	16.15
			9.8	0.65	0.53	1.3		0.64	16.15
			10.4	0.73	0.53	1.4		0.65	16.15
			11.0	0.77	0.53	1.5		0.64	16.15
			11.6	0.85	0.53	1.6	216.6	0.63	16.15
0300	36 11.1	122 6.0	12.1	0.93	0.54	1.7		0.62	16.10
			12.6	1.14	0.54	2.0		0.63	16.05
			13.1	1.34	0.56	2.4		0.64	15.90
			13.5	1.46	0.56	2.6		0.67	15.80
			14.0	1.50	0.56	2.7	190.2	0.64	15.75
			14.4	1.59	0.57	2.8		0.67	15.70
			14.9	1.74	0.58	3.1		0.65	15.60
			15.4					0.62	15.60
			15.8					0.61	15.55
			16.3	2.03	0.59	3.4	225.3	0.63	15.45
			16.8	2.17	0.67	3.1		0.61	15.45
			17.3	1.37	0.58	3.2		0.66	15.60
0323	36 6.1	122 6.2	17.8	1.87	0.57	3.3		0.64	15.70
			18.[illegible]	1.75	0.56	3.1		0.64	15.75
			19.[illegible]	1.5[illegible]	0.54	2.8	225.3	0.62	15.80
			19.[illegible]	0.97	0.53	1.8		0.57	15.95
			20.5	0.93	0.51	1.8		0.59	15.95
			21.1	1.19	0.55	2.0		0.58	15.95
			21.7	1.38	0.57	2.4		0.65	15.85
			22.4	1.67	0.59	2.8	36.3	0.57	15.90
			23.0	1.71	0.59	2.9		0.57	16.10
			23.7					0.55	16.30
			24.3					0.49	16.40
			24.9					0.52	16.55
			25.6	--.--	0.51		57.6	0.50	16.60
			26.2	--.--	0.51			0.50	16.60
			26.8	--.--	0.50			0.47	16.60
			27.5	--.--	0.48			0.47	16.60
			28.2	--.--	0.53			0.45	16.60
			28.8	--.--	0.54		157.[illegible]	0.46	16.65
0400	36 1.7	122 6.[illegible]	29.4	--.--	0.53			0.44	16.65

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			[illegible]	--.--	0.54			0.44	16.60
			30.[illegible]	0.04	0.54	0.1		0.45	16.60
			31.[illegible]	0.12	0.54	0.2		0.45	16.60
			31.[illegible]	0.12	0.53	0.2	116.0	0.44	16.55
			32.5	0.16	0.53	0.3		0.44	16.55
			33.1	0.24	0.55	0.4		0.42	16.55
			33.7	0.28	0.54	0.5		0.42	16.55
			34.3	0.45	0.55	0.8		0.42	16.55
			34.[illegible]	0.49	0.55	0.9	186.3	0.42	16.60
			35.5	0.49	0.55	0.9		0.43	15.60
			36.1					0.43	15.55
			36.7	0.93	0.58	1.6		0.44	16.50
			37.4	1.[illegible]2	0.60	2.0		0.45	16.45
			38.0	1.54	0.62	2.5	179.8	0.50	16.35
			38.6	1.87	0.64	2.9		0.50	16.20
			39.2	2.24	0.67	3.3		0.52	15.90
			39.8	2.60	0.68	3.8		0.55	15.65
			40.4	3.01	0.72	4.2		0.55	15.45
			41.0	2.81	0.69	4.1	179.7	0.53	15.35
			41.6	2.81	0.71	4.0		0.53	15.40
			42.2	2.81	0.75	3.7		0.52	15.40
			42.9	2.85	0.74	3.9		0.52	15.45
			43.5	2.85	0.74	3.9		0.46	15.45
			44.1	2.75	0.75	3.8	159.7	0.46	15.45
			44.7	2.89	0.75	3.9		0.46	15.50
			45.3	2.93	0.76	3.9		0.45	15.55
			45.9	3.01	0.75	4.0		0.45	15.50
			46.5	3.05	0.74	4.1		0.44	15.45
			47.1	3.01	0.75	4.0	121.9	0.44	15.45
0500	35 51.8	122 6.0	47.8	3.05	0.75	4.1		0.44	15.40
			48.4	3.15	0.75	4.1		0.44	15.40
			49.0	3.12	0.75	4.2		0.45	15.35
			49.7	3.25	0.75	4.3		0.43	15.35
			50.3	3.38	0.77	4.4	53.4	0.42	15.35
			50.9	3.54	0.78	4.5		0.41	15.30
			51.5	3.52	0.79	4.5		0.42	15.30
			52.[illegible]	3.66	0.74	4.9		0.42	15.25
			52.[illegible]	3.74	0.75	5.0		0.42	15.15
			53.4				54.7	0.37	15.10
			54.1					0.35	15.20
			54.7	3.66	0.74	4.9		0.37	15.30
			55.3	3.74	0.75	5.0		0.38	15.25
			55.[illegible]	3.60	0.75	4.8		0.38	15.40
			56.6	3.46	0.75	4.6	140.0	0.36	15.50
			57.2	3.33	0.74	4.5		0.37	15.60
			57.8	3.15	0.71	4.4		0.37	15.70
			58.5	2.76	0.67	4.1		0.42	15.75
			59.1	2.36	0.67	3.5		0.50	15.60
			59.7	2.15	0.62	3.5	335.9	0.54	15.80
			60.4	2.07	0.62	3.3		0.52	15.80

R/V ACANIA   27 SEPTEMBER 1979   CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			61.1	2.07	0.61	3.4		0.50	15.85
			61.6	2.11	0.62	3.4		0.48	15.90
			62.2	2.23	0.67	3.7		0.44	15.95
			62.9	2.28	0.62	3.7	171.3	0.38	16.10
			63.5	2.20	0.64	3.4		0.38	16.15
			64.1	2.20	0.63	3.5		0.36	16.20
			64.8	2.24	0.63	3.6		0.36	16.20
			65.4	2.15	0.63	3.4		0.36	16.25
			66.0	2.07	0.63	3.3	209.2	0.36	16.25
0600	35 41.6	122 6.9	66.6	1.99	0.62	3.2		0.38	16.30
			67.2	1.14	0.56	2.0		0.38	16.30
			67.8	0.93	0.53	1.8		0.39	16.45
			68.3	0.93	0.53	1.8		0.41	16.50
			68.9	0.89	0.52	1.7	160.1	0.44	16.55
			69.5	0.89	0.50	1.8		0.44	16.60
			70.1	0.89	0.52	1.7		0.47	16.65
			70.7					0.47	16.70
			71.2					0.46	16.70
			71.8				231.0	0.47	16.75
			72.4					0.47	16.75
			73.0					0.47	16.75
			73.6					0.47	16.75
			74.1					0.47	16.70
			74.7					0.47	16.70
			75.3				275.7	0.49	16.70
			75.9					0.48	16.70
			76.5					0.46	16.65
			77.0					0.45	16.65
			77.6					0.44	16.60
			78.2				270.2	0.44	16.60
			78.8					0.44	16.60
			79.4					0.44	16.60
			79.9					0.44	16.55
			80.5					0.42	16.55
			81.1				349.0	0.42	16.55
			81.7					0.41	16.55
			82.2					0.41	16.55
			82.9					0.40	16.55
			83.4				142.0	0.38	16.55
0700	35 32.2	122 7.3	84.0					0.38	16.55
			84.6					0.38	16.55
			85.2					0.38	16.55
			85.9					0.39	16.55
			86.4					0.40	16.55
			87.0					0.43	16.55
			87.5					0.41	16.55
			88.1					0.42	16.55
			88.7					0.42	16.55
			89.3				358.0	0.43	16.55
			89.9					0.45	16.60

R/V ACANIA   27 SEPTEMBER 1979   CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			90.5					0.46	16.60
			91.1	--.--	0.49			0.46	16.60
			91.6	--.--	0.46			0.46	16.60
			92.2	--.--	0.44		254.3	0.47	16.65
0730	35 27.5	1[illegible] 5.1	92.7	--.--	0.42			0.49	16.65
			93.3	0.01	0.45	0.0		0.50	16.60
			93.8	0.05	0.44	0.1		0.52	16.60
			94.3	0.05	0.43	0.1		0.54	16.60
			94.[illegible]	0.05	0.43	0.1	255.8	0.56	16.60
			95.4	0.05	0.43	0.1		0.57	16.50
			95.9	0.01	0.43	0.0		0.59	16.55
			96.4	0.01	0.43	0.0		0.60	16.50
			97.0	0.01	0.45	0.0		0.63	16.45
			97.5	0.01	0.45	0.0	350.4	0.64	16.45
			98.0	0.05	0.46	0.1		0.67	16.40
			98.5	0.09	0.43	0.2		0.68	16.40
			99.[illegible]	0.15	0.43	0.1		0.68	16.35
			99.6	0.19	0.44	0.2		0.68	16.35
			100.1	0.13	0.48	0.3	375.8	0.68	16.35
0800	35 31.0	122 5.1	100.6					0.68	16.35
			101.1					0.68	16.35
			101.7	0.13	0.46	0.3		0.66	16.35
			102.2	0.13	0.45	0.3		0.66	16.40
			102.7	0.17	0.47	0.4	380.1	0.65	16.40
			103.2	0.13	0.45	0.3		0.64	16.45
			103.7	0.21	0.46	0.5		0.64	16.50
			104.2	0.21	0.46	0.5		0.63	16.50
			104.8	0.21	0.47	0.4		0.62	16.55
			105.3	0.21	0.47	0.4	355.6	0.62	16.55
			105.8	0.25	0.46	0.6		0.61	16.55
			106.3	0.26	0.46	0.6		0.60	16.60
			106.8	0.30	0.47	0.6		0.62	16.60
			107.4	0.30	0.46	0.7		0.60	16.65
			107.9	0.30	0.47	0.6	408.3	0.56	16.60
			108.4	0.34	0.48	0.7		0.54	16.55
			108.9	0.39	0.48	0.8		0.52	16.55
			109.4	0.42	0.48	0.9		0.50	16.55
			110.0					0.47	16.50
			110.5				470.6	0.46	16.50
			111.1	0.42	0.49	0.9		0.44	16.50
			111.5	0.46	0.48	1.0		0.43	16.45
			112.0	0.45	0.48	1.0		0.43	16.45
			112.5	0.46	0.49	0.9		0.42	16.40
			113.1	0.46	0.49	0.9	357.0	0.43	16.40
			113.6	0.46	0.50	0.9		0.42	16.40
			114.1	0.46	0.49	0.9		0.40	16.40
			114.6	0.46	0.50	0.9		0.39	16.40
			115.1	0.50	0.48	1.0		0.38	16.40
			115.7	0.50	0.50	1.0	444.6	0.38	16.40
0900	35 [illegible]0.2	121 54.7	116.2	0.51	0.48	1.0		0.40	16.40

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

STA CST	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NITR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			116.7	0.55	0.49	1.1		0.40	16.40
			117.3					0.41	16.40
			117.9					0.42	16.40
			118.4				256.3	0.41	16.40
			118.9					0.40	16.40
			119.5					0.40	16.35
			120.0					0.40	16.35
			120.5					0.42	16.30
			121.1				342.1	0.44	16.30
			121.6					0.43	16.25
			122.2					0.43	16.30
			122.7	0.42	0.43	0.9		0.44	16.30
			123.3	0.42	0.47	0.9		0.44	16.35
			123.8	0.42	0.46	0.9	367.2	0.44	16.35
			124.3	0.42	0.46	0.9		0.45	16.40
			124.9	0.46	0.47	1.0		0.45	16.40
			125.4					0.44	16.40
			126.0					0.43	16.45
			126.5	0.42	0.46	0.9	265.0	0.44	16.50
			127.1	0.42	0.46	0.9		0.44	16.50
			127.6	0.42	0.46	0.9		0.44	16.55
			128.2	0.38	0.45	0.8		0.44	16.55
			128.7	0.34	0.44	0.8		0.44	16.50
			129.3	0.34	0.45	0.8	424.7	0.45	16.50
			129.8	0.34	0.44	0.8		0.46	16.50
			130.3	0.34	0.45	0.8		0.47	16.50
			130.9	0.34	0.45	0.9		0.46	16.50
			131.4	0.34	0.44	0.9		0.48	16.50
			132.0	0.34	0.44	0.8	333.7	0.48	16.50
1000	35 46.1	121 54.8	132.5	0.34	0.45	0.8		0.48	16.50
			133.1	0.34	0.44	0.8		0.47	16.50
			133.6	0.34	0.44	0.8		0.47	16.50
			134.2	0.34	0.45	0.8		0.47	16.50
			134.8	0.38	0.44	0.9	335.0	0.46	16.45
			135.3	0.33	0.45	0.8		0.46	16.40
			135.9					0.44	16.45
			136.4					0.47	16.50
			137.0					0.47	16.50
			137.6	1.12	0.59	1.7	347.2	0.45	16.50
			138.1	0.95	0.55	1.8		0.45	16.50
			138.7	0.99	0.54	1.8		0.46	16.50
			139.3	1.01	0.54	1.9		0.48	16.45
			139.8	1.05	0.56	1.9		0.48	16.45
			140.4	1.05	0.56	1.9	544.9	0.51	16.40
			140.9	1.02	0.55	1.9		0.51	16.50
			141.5	1.02	0.54	1.9		0.51	16.55
			142.1	1.05	0.53	2.0		0.52	16.50
			142.6	1.10	0.54	2.1		0.51	16.50
			143.2	1.02	0.52	2.0	363.6	0.50	16.50
			143.8	0.91	0.52	1.8		0.51	16.60

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			144.3	[illegible]	0.50	1.6		0.53	16.65
			144.9	0.74	0.50	1.5		0.53	16.65
			145.4	0.74	0.49	1.5		0.52	16.70
			146.0	0.71	0.49	1.4	426.8	0.53	16.70
			146.5	0.71	0.48	1.5		0.53	16.70
			147.1	0.69	0.47	1.5		0.54	16.70
			147.7					0.52	16.70
			148.2	0.13	0.47	0.3		0.50	16.70
			148.8	0.16	0.47	0.3		0.50	16.70
1100	35 54.4	121 51.2	149.3	0.19	0.47	0.4		0.49	16.70
			149.9	0.14	0.47	0.4		0.49	16.70
			150.4	0.19	0.46	0.4		0.50	16.70
			151.0	0.19	0.47	0.4		0.50	16.70
			151.5	0.19	0.47	0.4	314.8	0.51	16.70
			152.1	0.19	0.48	0.4		0.51	16.70
			152.6	0.19	0.47	0.4		0.52	16.70
			153.2	0.15	0.47	0.4		0.52	16.65
			153.7	0.19	0.47	0.4		0.55	16.65
			154.2	0.55			457.2	0.54	16.60
			154.8	0.55				0.54	16.60
			155.3	0.58				0.56	16.60
			155.9	0.58				0.58	16.60
			156.4	0.27				0.59	16.55
			157.0	0.27	0.33	0.8	447.0	0.59	16.50
			157.5	0.27	0.35	0.8		0.55	16.50
			158.0	0.27	0.35	0.8		0.61	16.50
			158.6	0.30	0.35	0.9		0.60	16.45
			159.1	0.33	0.35	0.9		0.61	16.45
			159.7	0.33	0.37	0.9	382.6	0.60	16.45
			160.2	0.33	0.37	0.9		0.62	15.45
			160.8	0.38	0.39	1.0		0.62	16.40
			161.3	0.41	0.38	1.1		0.65	16.40
			161.8	0.44	0.40	1.1		0.67	16.40
			162.4	0.46	0.40	1.2	453.4	0.67	16.35
			162.9	0.55	0.41	1.4		0.68	16.30
			163.5	0.65	0.41	1.7		0.70	16.25
			164.0	0.88	0.42	2.1		0.71	16.15
			164.6	1.05	0.43	2.4		0.72	16.10
			165.1	1.19	0.45	2.6	117.1	0.74	15.95
1200	36 2.3	121 45.3	165.7	1.38	0.46	3.0		0.74	15.95
			166.2					0.74	15.65
			166.8					0.74	15.75
			167.3	2.05	0.50	4.1		0.73	15.70
1208	36 3.5	121 44.4	167.9	1.88	0.50	3.8	154.1	0.73	15.70
			168.5	1.60	0.48	3.3		0.72	15.75
			169.0	1.43	0.47	3.0		0.73	15.80
			169.6	1.13	0.45	2.5		0.73	15.95
			170.2	0.88	0.45	2.0		0.70	16.05
			170.7	0.58	0.43	1.3	364.0	0.70	16.15
			171.3	0.45	0.42	1.2		0.69	16.25

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			171.9	0.44	0.41	1.1		0.66	16.30
			172.4	0.41	0.42	1.0		0.67	16.35
			173.0	0.44	0.46	1.0		0.65	16.35
			173.6	0.41	0.42	1.0	225.5	0.66	16.35
			174.1	[illegible]	0.41	0.9		0.66	16.40
			174.7	0.35	0.41	0.9		0.66	16.40
			175.3	0.33	0.41	0.8		0.64	16.40
			175.8	0.31	0.41	0.7		0.62	16.40
			176.4	0.30	0.42	0.7	257.2	0.60	16.40
			177.0	0.33	0.41	0.8		0.61	16.40
			177.5	0.33	0.41	0.8		0.62	16.45
			178.1					0.59	16.45
			178.7					0.56	16.45
			179.3				422.9	0.58	16.40
			179.8					0.55	16.40
			180.4					0.55	16.40
			181.0					0.54	16.45
			181.5					0.54	16.45
			182.1				196.2	0.53	16.45
1300	36 0.1	121 53.3	182.7	0.33	0.45	0.7		0.51	16.50
			183.2	0.30	0.45	0.7		0.51	16.50
			183.8	0.30	0.46	0.7		0.49	16.45
			184.5	0.30	0.46	0.7		0.50	16.45
			185.1	0.33	0.46	0.7	344.3	0.51	16.45
			185.6	0.63				0.52	16.40
			186.2	0.63				0.51	16.40
			186.8	0.35	0.49	0.7		0.51	16.35
			187.4	0.39	0.53	0.7		0.50	16.35
			188.0	0.46	0.53	0.9		0.51	16.35
			188.6	0.49	0.59	0.8		0.51	16.35
			189.2	0.52	0.63	0.8		0.52	16.35
			189.8	0.52	0.65	0.8		0.54	16.30
			190.4	0.55	0.67	0.8		0.55	16.30
			191.0	0.60	0.66	0.9	335.1	0.55	16.30
			191.6	0.63	0.64	1.0		0.56	16.30
			192.2	0.69	0.64	1.1		0.56	16.35
			192.8	0.71	0.64	1.1		0.56	16.35
			193.4	0.80	0.64	1.2		0.57	16.35
			193.9	0.82	0.62	1.3	325.9	0.57	16.25
			194.5	[illegible]				0.56	16.25
			195.1	0.91	0.61	1.5		0.57	16.30
			195.7	0.88				0.57	16.30
			196.3	0.96	0.58	1.7		0.56	16.20
			196.9	1.13	0.58	1.9	273.9	0.56	16.20
			197.5	1.10	0.58	1.9		0.56	16.20
			198.1	1.24	0.56	2.2		0.56	16.15
			198.7	1.30	0.49	2.7		0.57	16.10
			199.3	1.43	0.49	2.9		0.60	16.00
			199.9	1.66	0.53	3.1	396.7	0.62	16.00
1400	35 54.9	122 3.?	200.5	1.93	0.55	3.5		0.63	15.60

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			[illegible]	[illegible]	0.57	[illegible]		0.64	15.55
			201.[illegible]	[illegible]	0.62	4.9		0.62	15.55
			202.2	2.68	0.61	4.4		0.63	15.55
			202.8	2.79	0.60	4.6	264.6	0.64	15.45
			203.4	3.15	0.64	4.9		0.63	15.40
			204.0	3.28	0.65	5.2		0.63	15.15
			204.6	3.63	0.66	5.5		0.62	15.15
			205.1	3.60	0.71	5.1		0.62	15.25
			205.7	3.54	0.65	5.4	152.3	0.62	15.30
			206.3	3.57	0.65	5.5		0.62	15.30
			206.9	3.63	0.64	5.6		0.62	15.20
			207.5	3.82	0.65	5.8		0.61	15.20
			208.1	3.60	0.65	5.7		0.62	15.20
			208.7	3.40	0.63	5.5	838.4	0.64	15.25
			209.3	3.41	0.62	5.5		0.64	15.25
			209.9	3.32	0.62	5.4		0.65	15.30
			210.4	3.35	0.62	5.4		0.66	15.20
			211.0	3.46	0.62	5.6		0.67	15.20
			211.6	3.65	0.64	5.7	59.5	0.67	15.10
			212.2	3.88	0.64	6.1		0.68	15.10
			212.8	3.96	0.66	6.0		0.71	15.20
			213.4	4.01	0.67	6.0		0.73	15.10
			213.9	[illegible]	0.65	6.0		0.76	15.10
			214.5	[illegible]	0.66	6.0	79.4	0.76	15.10
			215.1	[illegible]	0.65	6.1		0.77	15.15
			215.7	3.62	0.65	5.9		0.79	15.05
			216.3	3.74	0.63	5.9		0.79	15.00
			216.9	3.74	0.63	5.9		0.83	15.05
			217.5	3.69	0.65	5.7	266.9	0.87	15.00
1500	35 48.3	122 11.7	218.1	3.72	0.65	5.7		0.50	15.00
			218.6	3.75	0.65	5.8		0.38	14.95
			219.2	3.78	0.65	5.8		0.34	14.90
			219.8					0.33	14.65
			220.4	4.17	0.65	6.3	237.8	0.26	14.85
			221.0	4.21	0.70	6.2		0.26	14.80
			221.6	4.36	0.70	6.2		0.25	14.80
			222.2	4.31	0.70	6.2		0.31	14.65
			222.7	4.25	0.71	6.0		0.61	14.90
			223.3	4.11	0.70	5.9	135.5	0.60	14.90
			223.9	4.00	0.70	5.7		0.62	15.00
			224.5	3.83	0.69	5.6		0.60	15.05
			225.1	3.75	0.67	5.6		0.59	15.10
			225.7	3.75	0.68	5.5		0.57	15.15
			226.3	3.65	0.66	5.6	86.2	0.55	15.20
			226.8	3.55	0.66	5.4		0.52	15.25
			227.4	3.55	0.66	5.4		0.51	15.25
			228.0	3.55	0.65	5.5		0.50	15.25
			228.6	3.80	0.68	5.6		0.46	15.20
			229.2	3.75	0.67	5.6	128.6	0.47	15.20
			229.8	3.75	0.68	5.5		0.46	15.25

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			230.4	2.75	0.71	5.4		0.44	15.25
			231.0	3.86	0.71	5.5		0.42	15.35
			231.5	3.61	0.68	5.3		0.44	15.45
			232.1	3.41	0.67	5.1	116.4	0.44	15.50
			232.7	3.02	0.66	4.6		0.42	15.55
			233.3					0.42	15.60
			233.9					0.40	15.65
			234.5					0.41	15.65
			235.1				175.9	0.39	15.65
1600	35 42.2	122 20.9	235.6					0.34	15.65
			236.2					0.34	15.65
			236.8					0.34	15.65
			237.4					0.34	15.65
			237.9				156.9	0.35	15.65
			238.5	2.91	0.68	4.3		0.35	15.65
			239.1	2.88	0.65	4.4		0.35	15.65
			239.7	3.10	0.65	4.6		0.35	15.50
			240.2	3.11	0.64	4.9		0.35	15.45
			240.8	3.22	0.64	5.0	186.9	0.35	15.45
1620	35 40.4	122 23.5	241.4	3.36	0.65	5.2		0.33	15.45
			241.9	3.41	0.70	4.9		0.36	15.40
			242.5	3.44	0.70	4.9		0.35	15.40
			243.0	3.33				0.35	15.55
			243.6	2.85			50.6	0.36	15.60
			244.1	1.59				0.37	16.05
			244.7	1.46				0.36	16.25
			245.2	1.18				0.36	16.30
			245.9	1.12				0.38	16.35
			246.4	1.07			114.9	0.36	16.35
			246.9					0.36	16.40
			247.5					0.36	16.40
			248.0					0.40	16.45
			248.6					0.42	16.50
			249.1				269.8	0.42	16.55
			249.7					0.41	16.55
			250.2					0.40	16.60
			250.8					0.41	16.60
			251.4					0.43	16.65
			251.9				157.9	0.44	16.65
1700	35 39.3	122 16.4	252.5					0.41	16.70
			253.1					0.41	16.70
			253.6	0.44	0.49	0.9		0.42	16.70
			254.2	0.33	0.50	0.7		0.44	16.70
			254.8	0.33	0.49	0.7	206.7	0.43	16.70
			255.4	0.31	0.49	0.6		0.43	16.70
			255.9	0.28	0.49	0.6		0.43	16.70
			256.5	0.25	0.49	0.5		0.45	16.65
			257.1	0.25	0.49	0.5		0.46	16.65
			257.7	0.28	0.51	0.6	208.7	0.44	16.65
			258.2	0.28	0.50	0.6		0.46	16.65

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			[illegible]	0.30	0.51	0.6		0.45	16.60
			258.4	0.28	0.50	0.6		0.45	16.60
			259.[illegible]	0.24	0.52	0.6		0.47	16.55
			25[illegible].5	0.23	0.50	0.5	219.9	0.46	16.55
			261.1	0.23	0.4[illegible]	0.6		0.46	16.55
			261.7	0.25	0.50	0.5		0.44	16.55
			262.[illegible]	0.25	0.49	0.5		0.46	16.55
			262.8	0.25	0.48	0.5		0.47	16.55
			263.[illegible]	0.25	0.48	0.5	504.8	0.47	16.55
			264.[illegible]	0.22	0.51	0.4		0.47	16.55
			264.5	0.22	0.51	0.4		0.48	16.60
			265.1	0.19	0.49	0.4		0.48	16.60
			265.7	0.19	0.48	0.4		0.48	16.55
			266.3	0.19	0.49	0.4	132.0	0.49	16.55
			266.8	0.22	0.49	0.4		0.53	16.55
			267.4	0.19	0.51	0.4		0.54	16.55
			268.[illegible]	0.19	0.51	0.4		0.52	16.50
			268.5	0.22	0.50	0.4		0.50	16.50
			269.1				368.0	0.52	16.55
1800	35 39.3	122 5.0	269.7					0.50	16.55
			270.[illegible]					0.50	16.55
			270.9					0.46	16.55
			271.5					0.46	16.55
			272.1				291.8	0.46	16.55
			272.7	0.28	0.44	0.6		0.46	16.55
			273.[illegible]	0.28	0.47	0.6		0.49	16.50
			273.[illegible]	0.33	0.47	0.7		0.51	16.50
			274.4	0.33	0.51	0.6		0.51	16.45
			275.0	0.30	0.51	0.6	210.8	0.52	16.45
			275.6	0.33	0.51	0.6		0.47	16.40
			276.[illegible]	0.33	0.54	0.6		0.52	16.35
			276.8	0.33	0.57	0.6		0.52	16.45
			277.3	0.30	0.59	0.5		0.55	16.45
			277.9	0.25	0.53	0.5	563.3	0.55	16.45
			278.5	0.25	0.49	0.5		0.48	16.45
			279.1	0.25	0.50	0.5		0.50	16.40
			279.7	0.30	0.51	0.6		0.52	16.35
			280.3	0.33	0.51	0.6		0.50	16.40
			28[illegible]	0.3[illegible]	0.51	0.6	361.6	0.53	16.45
			281.4	0.25	0.51	0.5		0.53	16.50
			282.0	0.19	0.52	0.4		0.51	16.50
			282.6	0.14	0.51	0.3		0.51	16.50
			283.[illegible]	0.19	0.51	0.4		0.51	16.55
			283.[illegible]	0.19	0.51	0.4	536.6	0.49	16.60
			284.4	0.19	0.51	0.4		0.49	16.65
			285.0	0.22	0.51	0.4		0.54	16.60
			285.6	0.19	0.52	0.4		0.52	16.60
			286.1	0.16	0.52	0.3		0.54	16.60
			286.7				604.2	0.55	16.65
1900	35 40.5	121 5[illegible].4	287.3					0.49	16.65

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			287.9	--.--	0.45			0.52	16.70
			288.5	--.--	0.48			0.54	16.65
			289.1	--.--	0.49			0.51	16.60
			289.7	--.--	0.49		691.3	0.51	16.65
			290.3	--.--	0.47			0.45	16.70
			290.9	--.--	0.48			0.53	16.75
			291.5	--.--	0.49			0.53	16.70
			292.1	--.--	0.49			0.53	16.65
			292.7	--.--	0.49		720.7	0.50	16.60
			293.3	--.--	0.49			[illegible]	16.60
			293.9	--.--	0.49			0.45	16.55
			294.5	--.--	0.47			0.52	16.50
			295.1	--.--	0.51			0.51	16.50
			295.7	--.--	0.48		211.4	0.47	16.40
			296.3	--.--	0.43			0.46	16.35
			296.9	--.--	0.37			0.48	16.30
			297.5					0.51	16.25
			298.1					0.53	16.30
			298.7	--.--	0.41		314.1	0.55	16.35
			299.3	--.--	0.44			0.61	16.40
			299.9	--.--	0.46			0.54	16.40
			300.5	--.--	0.48			0.54	16.45
			301.1	--.--	0.49			0.54	16.45
			301.7	--.--	0.47		305.1	0.51	16.50
			302.3	--.--	0.47			0.45	16.60
			302.9	--.--	0.49			0.49	16.60
			303.5	--.--	0.50			0.46	16.60
			304.1	--.--	0.51			0.45	16.60
			304.7	--.--	0.51		246.4	0.44	16.60
2000	35 42.8	121 41.8	305.3	--.--	0.53			0.48	16.60
			305.9	--.--	0.53			0.46	16.60
			306.4	--.--	0.54			0.51	16.60
			307.0	--.--	0.56			0.52	16.55
			307.6	--.--	0.54		257.3	0.54	16.55
			308.2	--.--	0.54			0.55	16.50
			308.8					0.54	16.45
			309.4	--.--	0.50			0.54	16.45
			310.0	--.--	0.53			0.54	16.40
			310.5	0.11	0.54	1.2	111.3	0.53	16.35
			311.1	0.30	0.56	0.5		0.52	16.20
			311.7	0.42	0.58	0.7		0.56	16.20
			312.3	0.58	0.60	1.0		0.57	16.05
			312.9	0.95	0.63	1.5		0.63	15.90
			313.5				386.5	0.64	15.80
2030	35 43.4	121 36.0	314.1	1.15				0.71	15.95
			314.6	1.75				0.76	16.10
			315.1	0.59	0.79	0.7		0.69	16.30
			315.7	0.33	0.60	0.5		0.67	16.30
			316.2	0.25	0.54	0.5	251.8	0.61	16.35
			316.7	0.25	0.52	0.5		0.58	16.30

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CELIST IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			317.2	0.2[illegible]	0.49	0.6		0.58	15.35
			317.[illegible]					0.59	16.40
			318.4					0.64	16.40
			318.9				194.6	0.63	16.45
			319.5	0.05	0.35	0.1		0.62	16.45
			320.0	0.05	0.39	0.1		0.60	16.45
			320.5					0.60	16.45
			321.1					0.55	16.50
			321.6				265.1	0.60	16.55
2100	35 45.6	121 40.7	322.2					0.60	16.50
			322.8	0.15	0.39	0.1		0.58	16.55
			323.3	0.11	0.33	0.3		0.55	16.55
			323.9	0.[illegible]5	0.36	0.1		0.56	16.55
			324.4	0.05	0.37	0.1	195.5	0.56	16.60
			325.0	0.05	0.37	0.1		0.55	16.60
			325.6	0.05	0.41	0.1		0.52	16.65
			326.1	0.08	0.39	0.2		0.52	16.70
			326.7	0.11	0.43	0.3		0.53	16.70
			327.2	0.08	0.39	0.2	304.2	0.50	16.70
			327.8	0.09	0.38	0.2		0.52	16.70
			328.4	0.11	0.33	0.3		0.55	16.75
			328.9	0.11	0.38	0.3		0.55	16.75
			329.5	0.11	0.38	0.3		0.55	16.75
			330.1				265.5	0.54	16.80
			330.6					0.54	16.80
			331.2					0.53	16.85
			331.7					0.52	16.90
			332.3	0.05	0.31	0.2		0.52	16.90
			332.9	0.08	0.33	0.2	258.9	0.50	16.95
			333.4	0.0[illegible]	0.35	0.2		0.52	16.95
			334.0	0.08	0.35	0.2		0.52	17.00
			334.5	0.0[illegible]	0.35	0.2		0.50	17.00
			335.1	0.08	0.37	0.2		0.49	17.05
			335.7	0.08	0.37	0.2	134.7	0.49	17.05
			336.2	0.08	0.37	0.2		0.49	17.05
			336.8	0.08	0.38	0.2		0.49	17.00
			337.4	0.14	0.38	0.4		0.49	17.00
			337.9	0.16	0.38	0.4		0.54	17.00
			338.5	0.28	0.40	0.7	158.7	0.53	17.00
2200	35 49.[illegible]	121 51.[illegible]	339.0	0.28	0.41	0.7		0.53	17.00
			339.6	0.33	0.41	0.8		0.50	17.00
			340.2	0.42	0.42	1.0		0.48	17.00
			340.8	0.39	0.43	0.9		0.49	16.90
			341.3	0.42	0.41	1.0	1287.5	0.46	16.85
			341.9					0.46	16.85
			342.5					0.45	16.90
			343.0	0.28	0.37	0.8		0.45	16.90
			343.6	0.42	0.44	1.0		0.44	16.90
			344.2	0.39	0.42	0.9	51.7	0.43	16.90
			344.7	0.42	0.41	1.0		0.43	16.90

R/V ACANIA 27 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			345.3	0.39	0.41	1.0		0.42	16.80
			345.9	0.36	0.39	0.9		0.44	16.80
			346.4	0.36	0.42	0.9		0.44	16.75
			347.0	0.38	0.41	0.9	191.8	0.44	16.75
			347.6	0.36	0.41	0.9		0.44	16.75
			348.1	0.37	0.42	0.9		0.45	16.80
			348.7	0.35	0.42	0.9		0.44	16.80
			349.3	0.39	0.42	0.9		0.46	16.75
			349.8	0.39	0.42	0.9	285.4	0.44	16.75
			350.4	0.35	0.42	0.9		0.46	16.75
			351.0	0.42	0.44	1.0		0.43	16.75
			351.5	0.50	0.45	1.1		0.42	16.75
			352.1					0.40	16.75
			352.7				123.0	0.39	16.75
			353.2	0.72	0.45	1.6		0.37	16.75
			353.8	0.84	0.49	1.8		0.36	16.70
			354.4	0.98	0.51	1.9		0.35	16.60
			354.9	1.29	0.51	2.5		0.34	16.50
			355.5	1.62	0.55	2.9	107.3	0.33	16.55
2300	35 52.1	122 1.8	356.1	1.59	0.55	2.9		0.36	16.55
			356.6	1.54	0.56	2.8		0.39	16.60
			357.2	1.51	0.56	2.7		0.41	16.50
			357.7	1.59	0.55	2.8		0.41	16.55
			358.3	1.59	0.54	2.9	299.8	0.40	16.50
			358.8	1.59	0.55	2.9		0.39	16.35
			359.4	1.79	0.61	3.0		0.45	16.20
			359.9	2.24	0.61	3.7		0.44	16.10
			360.5	2.43	0.61	4.0		0.37	16.00
			361.0	2.49	0.62	4.0	306.2	0.37	16.00
			361.6	2.66	0.64	4.2		0.37	15.85
			362.1	3.11	0.67	4.6		0.36	15.90
			362.7	3.11	0.67	4.6		0.32	15.90
			363.2	3.42	0.71	4.8		0.31	15.85
			363.8	3.36	0.71	4.8	221.5	0.31	15.60
			364.3	3.44	0.72	4.8		0.30	15.85
			364.9	3.50	0.72	4.9		0.29	15.65
			365.4	3.36	0.71	4.7		0.28	15.90
			366.0	3.05	0.68	4.5		0.28	15.95
			366.5	2.94	0.67	4.4	175.8	0.28	15.85
			367.1	2.88	0.66	4.4		0.27	15.90
			367.6	2.91	0.67	4.3		0.27	16.00
			368.2	2.94	0.66	4.5		0.26	15.80
			368.7	2.91	0.68	4.3		0.26	15.90
			369.3	2.91	0.69	4.2	180.5	0.31	15.95
			369.8	2.91	0.68	4.3		0.26	15.95
			370.3	2.72	0.66	4.1		0.25	16.05
			370.9	2.57	0.66	3.9		0.24	16.10
			371.4	2.49	0.65	3.8		0.26	16.00
			372.0	2.49	0.70	3.6	172.0	0.25	16.00
0000	35 55.1	122 12.2	372.5	2.38	0.64	3.7		0.24	16.05

R/V ACANIA 28 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			373.0	2.21	0.66	3.3		0.22	16.20
			373.5	1.96	0.64	3.1		0.21	16.30
			374.0	1.76	0.73	2.4		0.20	16.40
			374.5	1.45	0.61	2.4	283.6	0.26	16.55
			375.0	1.17	0.58	2.0		0.24	16.70
			375.5	1.09	0.58	1.9		0.23	16.75
			375.9	0.92	0.54	1.7		0.24	16.75
			376.4	0.81	0.54	1.5		0.20	16.70
			376.9	0.75	0.54	1.4	352.3	0.18	16.70
			377.4	0.58	0.54	1.1		0.17	16.65
			377.9	0.56	0.54	1.0		0.17	16.65
			378.4	0.53	0.54	1.0		0.15	16.70
			378.9	0.42	0.53	0.8		0.14	16.70
			379.4				329.2	0.16	16.70
			379.9					0.13	16.70
			380.4					0.12	16.70
			380.9					0.11	16.70
			381.4					0.10	16.70
			381.9				345.6	0.09	16.65
			382.4					0.09	16.65
			382.9					0.08	16.65
			383.4					0.07	16.60
			383.9					0.07	16.70
			384.3				173.9	0.06	16.05
			384.9					0.06	16.00
			385.4					0.06	16.05
0053	35 57.6	122 21.5	386.0					0.05	16.45
			386.6					0.04	16.65
			387.3				255.8	0.04	16.70
0100	35 57.1	122 21.0	387.9					0.04	16.70
			388.6					0.04	16.70
			389.2					0.04	16.70
			389.9					0.05	16.70
			390.6				332.8	0.05	16.70
			391.2					0.06	16.70
			391.9					0.06	16.70
			392.6					0.07	16.70
			393.2					0.07	16.70
			393.9				216.0	0.07	16.70
			394.5					0.06	16.60
			395.2					0.08	16.50
			395.9					0.08	16.30
			396.5					0.09	15.85
			397.2		0.85		283.0	0.09	15.65
			397.9		0.79			0.10	15.60
			398.6		0.78			0.12	15.60
			399.2		0.74			0.13	15.65
			399.9		0.70			0.13	15.75
			400.6		0.67		295.3	0.14	15.80
			401.2		0.68			0.14	15.80

R/V [illegible] 28 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			401.[illegible]		0.64			0.14	15.80
			402.[illegible]		0.63			0.15	15.80
			403.[illegible]		0.61			0.16	15.75
			403.[illegible]		0.61		260.9	0.17	15.80
			404.[illegible]		0.63			0.15	15.75
			405.[illegible]		0.63			0.15	15.70
			405.9		0.65			0.16	15.65
			406.6		0.71			0.16	15.60
			407.2				277.3	0.16	15.35
0200	35 40.4	122 13.1	407.[illegible]					0.14	15.35
			408.5	--.--	0.72			0.14	15.35
			409.1	--.--	0.74			0.14	15.30
			409.7	--.--	0.77			0.14	15.30
			410.4	--.--	0.79		2585.9	0.12	15.50
			411.0	--.--	0.81			0.11	15.45
			411.6	--.--	0.85			0.10	15.25
			412.2	--.--	0.84			0.11	15.25
			41[illegible]	--.--	0.96			0.10	15.65
			413.5	--.--	0.81		384.5	0.10	15.65
			414.1	--.--	0.76			0.09	15.70
			414.7	--.--	0.73			0.09	15.75
			415.3	--.--	0.72			0.08	15.70
			41[illegible]	--.--	0.77			0.09	15.55
			416.[illegible]	--.--	0.72		1167.6	0.08	16.05
			417.[illegible]	--.--	0.66			0.09	16.10
			417.8					0.09	16.30
			418.5					0.06	16.45
			419.1					0.05	16.70
			419.7				169.2	0.05	16.65
			42[illegible].3					0.04	16.75
			421.[illegible]					0.05	16.80
			421.6					0.04	16.80
			422.2					0.04	16.80
			422.[illegible]				195.2	0.04	16.70
			42[illegible].5					0.04	16.80
			424.1					0.03	16.65
			424.7					0.03	15.70
			425.[illegible]					0.02	16.70
			42[illegible]				257.1	0.02	16.70
0300	35 40.3	122 4.9	426.5					0.02	16.70
			427.[illegible]					0.02	16.70
			427.6					0.02	16.70
			428.1					0.02	16.70
			428.6				327.5	0.02	16.70
			429.2					0.02	16.70
			429.7					0.02	16.70
			430.2					0.02	16.75
			43[illegible].8					0.02	16.75
			431.3				1829.5	0.02	16.75
			431.9					0.03	16.75

R/V ACANIA 28 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE (NORTH)	LONGITUDE (WEST)	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			432.4					0.03	16.75
			432.9					0.03	16.75
			433.5					0.03	16.75
			434.0				355.8	0.03	16.75
			434.5					0.03	16.75
			435.1					0.03	16.70
			435.6					0.03	16.70
			436.1					0.03	16.70
			436.7				267.3	0.03	16.70
			437.2					0.03	16.70
			437.8					0.03	16.70
			438.3					0.03	16.70
			438.8					0.03	16.65
			439.4				362.0	0.03	16.65
			439.9					0.03	16.60
			440.4	0.44	0.47	0.9		0.03	16.60
			441.0	0.44	0.43	1.0		0.03	16.70
			441.5	0.47	0.42	1.1		0.03	16.60
			442.1	0.50	0.41	1.2	478.4	0.03	16.65
0400	35 34.8	121 57.1	442.6	0.53	0.39	1.4		0.03	16.60
			443.2	0.50	0.39	1.3		0.03	16.60
			443.8	0.56	0.37	1.5		0.03	16.60
			444.3	0.53	0.36	1.5		0.03	16.65
			444.9	0.47	0.37	1.3	350.5	0.03	16.65
			445.5	0.47	0.36	1.3		0.03	16.65
			446.0	0.53	0.37	1.4		0.03	16.60
			446.6	0.53	0.37	1.4		0.03	16.60
			447.2	0.55	0.38	1.5		0.03	16.55
			447.7	0.53	0.37	1.4	314.1	0.03	16.50
			448.3	0.50	0.35	1.4		0.03	16.50
			448.9	0.44	0.37	1.2		0.03	16.50
			449.4	0.42	0.40	1.0		0.03	16.50
			450.0					0.03	16.50
			450.6				324.8	0.03	16.50
			451.1					0.03	16.45
			451.7					0.03	16.45
			452.3					0.03	16.45
			452.8					0.03	16.45
			453.4				240.9	0.02	16.50
			454.0					0.02	16.45
			454.5					0.02	16.50
			455.1					0.02	16.40
			455.7					0.02	16.40
			456.2				315.8	0.02	16.45
			456.8					0.02	16.40
			457.4					0.02	16.40
			458.0					0.02	16.30
			458.5					0.02	16.30
			459.1				347.9	0.02	16.25
			459.7					0.02	16.25

R/V ACANIA 28 SEPTEMBER 1979 CHEMICAL MESOSCALE (CRUISE IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			460.[illegible]					0.02	16.25
			460.[illegible]					0.02	16.20
0505	35 28.[illegible]	121 44.0	461.[illegible]					0.03	16.20
			461.7				242.7	0.03	16.25
			462.[illegible]					0.03	16.20
			462.6					0.03	16.20
			463.1					0.03	16.25
			463.6					0.03	16.25
			464.0				583.7	0.03	16.25
			464.5					0.03	16.30
			465.0					0.03	16.30
			465.4					0.03	16.30
			465.9					0.03	16.40
			466.[illegible]				268.2	0.03	16.45
			466.8					0.04	16.50
			467.3					0.04	16.50
			467.7					0.04	16.50
			468.2					0.04	16.50
			468.7				325.7	0.03	16.50
			469.1					0.04	16.45
			469.6					0.04	16.45
			470.0					0.04	16.45
			470.5					0.04	16.45
			471.0				407.8	0.04	16.45
			471.4					0.04	16.45
			471.9					0.04	16.45
			472.4					0.04	16.45
			472.8					0.05	16.45
			473.3	--.--	0.27		500.1	0.04	16.40
0600	35 35.[illegible]	121 49.5	473.8	--.--	0.18			0.04	16.40
			474.4	--.--	0.14			0.04	16.45
			474.9	--.--	0.14			0.04	16.40
			475.5	--.--	0.12			0.04	16.40
			476.0	--.--	0.12		297.6	0.04	16.40
			476.5	--.--	0.12			0.04	16.35
			477.1	--.--	0.44			0.04	16.35
			477.7	--.--	0.45			0.04	16.35
			478.2	0.03	0.44	0.1		0.04	16.35
			478.8	--.--	0.43		543.5	0.03	16.35
			479.3	--.--	0.43			0.03	16.40
			479.9	--.--	0.41			0.03	16.40
			480.4	--.--	0.47			0.03	16.40
			481.0	--.--	0.40			0.03	16.45
			481.5	--.--	0.39		249.3	0.03	16.50
			482.1	--.--	0.41			0.03	16.50
			482.6	--.--	0.39			0.03	16.55
			483.2	--.--	0.40			0.03	16.60
			483.7	--.--	0.35			0.03	16.60
			484.2	--.--	0.35		514.1	0.02	16.65
			484.[illegible]	--.--	0.35			0.02	16.65

R/V ACANIA   28 SEPTEMBER 1979   CHEMICAL MESOSCALE (CELIST IX)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			485.4	--.--	0.35			0.02	16.65
			485.9	--.--	0.36			0.02	16.70
			486.5	--.--	0.36			0.02	16.70
			487.1	--.--	0.37		770.2	0.02	16.70
			487.6	--.--	0.36			0.02	16.70
			488.1	--.--	0.36			0.02	16.70
			488.7	--.--	0.37			0.02	16.75
			489.3	--.--	0.37			0.02	16.75
			489.8	--.--	0.37		346.4	0.02	16.75
0700	35 43.6	121 52.2	490.4	--.--	0.37			0.02	16.75
			491.0	--.--	0.37			0.02	16.80
			491.6	--.--	0.37			0.02	16.75
			492.2	--.--	0.39			0.03	16.70
			492.8	--.--	0.38		421.5	0.03	16.70
			493.4	--.--				0.03	16.70
			494.0	--.--				0.04	16.75
			494.6	--.--				0.04	16.75
			495.2	--.--	0.33			0.04	16.80
			495.8	--.--	0.32		361.6	0.05	16.65
			496.4	--.--	0.31			0.05	16.65
			497.0	--.--	0.31			0.05	16.80
			497.6	--.--	0.32			0.05	16.80
			498.1	--.--				0.06	16.80
			498.7	--.--			305.0	0.06	16.80
			499.3	--.--				0.06	16.80
			499.9	--.--	0.54			0.06	16.80
			500.5	--.--	0.52			0.07	16.80
			501.1	--.--	0.52			0.07	16.80
			501.7	0.13	0.51	0.1	451.1	0.08	16.80
			502.3	--.--	0.49			0.08	16.80
			502.9	--.--	0.50			0.08	16.75
			503.5	--.--	0.52			0.09	16.75
			504.1	--.--	0.52			0.09	16.70
			504.7						

R/V ACANIA 29 NOVEMBER 1979 CHEMICAL MACROSCALE (CRLIST X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
0142	36 6.5	121 57.5	0.6						
			1.2						
			1.8						
			2.4						
			3.0				355.0		
			3.6						
			4.1						
			4.7						
			5.3						
0200	36 3.8	121 55.5	5.9				285.0		
			6.5						
			7.1						
			7.7						
			8.3						
			8.9				424.0		
			9.5	0.17					
			10.1	0.22					
			10.7	0.22					
			11.3	0.22					
			11.9	0.13			577.0		15.40
			12.4	0.13					15.50
			13.0	--.--					15.50
			13.6	--.--					15.40
			14.2	--.--					15.40
			14.8	--.--			441.0		15.35
			15.4	--.--					15.40
			16.0	0.17					15.30
			16.6	0.22					15.35
			17.2	--.--					15.40
			17.8	--.--			519.0		15.35
			18.4	--.--					15.35
			19.0	--.--					15.40
			19.6	--.--					15.35
			20.1	--.--					15.45
			20.7	--.--			434.0		15.40
			21.3	--.--					15.30
			21.9	--.--					15.25
0255	35 56.4	121 50.6	22.5	--.--					15.30
			23.1	--.--					15.30
			23.7	--.--			435.0		15.35
			24.3	--.--					15.20
			24.9	0.22					15.10
			25.4	0.31					15.10
			26.0						15.10
			26.6				665.0		15.10
			27.2						15.05
			27.8						15.05
			28.4	0.72					15.15
			29.0	0.81					15.15
			29.6	0.49			466.0		15.10

R/V ACANIA 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			30.1	0.40					15.10
			30.7	0.31					15.15
			31.2	0.27					15.00
			31.9	0.17					15.20
			32.5				429.0		15.15
			33.1						15.15
			33.7						15.15
			34.2						15.15
			34.8						15.15
			35.4				358.0		15.10
			36.0						15.15
			36.6						15.15
			37.2						15.20
			37.8						15.40
			38.3				374.0		15.10
			38.9						15.15
			39.5						15.15
			40.1						15.20
			40.7						15.20
			41.3				366.0		15.15
			41.9						15.25
			42.5						15.20
0405	36 0.4	121 37.9	43.1						15.15
			43.6						15.15
			44.2				415.0		15.15
			44.9						15.15
			45.4						15.15
			46.0						15.15
			46.6						15.15
			47.1				432.0		15.15
			47.7						15.15
			48.3						15.15
			48.9						15.15
			49.5						15.15
			50.1				335.0		15.15
			50.7						15.20
			51.2						15.20
			51.8						15.20
			52.4						15.20
			53.0				353.0		15.15
			53.6						15.15
			54.2						15.15
			54.8						15.15
			55.4						15.15
			56.0				286.0		15.15
			56.5						15.15
			57.1						15.15
			57.7						15.20
			58.3						15.20
0500	36 7.3	121 45.3	58.7				434.0		15.15

R/V ACANIA 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			59.1						15.15
			59.5						15.10
			60.1						15.10
			60.4						15.10
			[illegible]				362.0		15.15
			61.2						15.10
			61.6						15.15
			62.1						15.10
			62.5						14.90
			62.9				420.0		14.90
			63.3						14.70
			63.7						14.35
			64.2						14.25
			64.6						14.35
			65.0				322.0		14.25
			65.4						14.15
			65.8						14.20
0535	36 10.6	121 49.1	66.3						14.25
0538	36 11.1	121 48.7	66.7						14.35
			67.1				445.0		14.50
			67.5						14.65
			67.9						14.45
0545	36 9.9	121 48.2	68.4						14.35
			68.8						14.40
			69.2				477.0		14.75
			69.6						14.90
			70.1						14.50
0555	36 9.3	121 49.4	70.5						14.80
			71.2						14.40
			71.9				533.0		14.45
			72.4						14.30
			73.0						14.25
			73.6						14.15
0608	36 10.9	121 51.8	74.2						14.05
			74.8				454.0		14.10
			75.4						14.00
			76.0						14.00
			76.6						14.10
			77.2						14.15
			77.8				479.0		14.00
0622	36 12.3	121 49.6	78.4						13.80
			78.9						13.45
			79.4						14.15
			80.0						14.30
			80.5				463.0		14.30
			81.0						14.45
			81.6						14.55
			82.1						14.60
			82.7						14.45
			83.2				524.0		14.45

R/V ACANIA 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NH3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			83.7						14.70
			84.2						14.70
0645	37 9.7	121 47.0	84.7						14.85
			85.6						14.65
			86.3				335.0		14.45
			86.9						15.15
			87.3						15.10
			88.2						15.10
			88.9						15.05
			89.6				481.0		14.90
			90.2						14.55
0703	36 7.8	121 49.2	90.7						14.80
			91.2						14.80
			91.7						14.80
			92.2				377.0		14.75
			92.7						14.60
			93.2						14.50
			93.7						14.40
			94.2						14.30
			94.7				415.0		14.60
			95.2						14.85
			95.7						14.80
			96.2						14.80
			96.7						14.75
			97.2						14.70
			97.7				362.0		14.70
0734	36 11.0	121 52.5	98.4						14.70
			99.1						14.70
			99.9						14.70
			100.6				452.0		14.75
			101.2						14.30
			102.0						13.40
			102.7						13.90
0747	36 12.7	121 50.2	103.2						13.55
			103.8				388.0		13.65
0752	36 13.2	121 50.8	104.2						13.75
			104.8						13.30
			105.3						13.00
			105.8						13.90
0800	36 12.7	121 51.5	106.5				338.0		14.25
			107.2						14.60
			107.9						14.65
			108.5						14.65
			109.2						14.65
			109.9				430.0		14.65
			110.6						14.50
			111.2						14.50
			111.9						14.50
0817	36 11.5	121 54.2	112.6						14.50
			113.2				243.0		14.50

R/V ACANIA 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			113.4						14.51
			114.0						14.51
			115.2						14.55
			115.8						14.55
			116.4				382.0		14.65
			117.2						14.73
			117.9						14.65
			118.6						14.95
			119.2						14.95
			119.8				433.0		15.10
			120.5						14.55
			121.2						14.80
			121.9						14.65
			122.6						14.65
			123.2				497.0		14.65
			123.9						14.60
			124.6						14.45
0855	36 5.5	121 49.8	125.2						14.45
			125.8						14.55
			126.5				417.0		14.65
0902	36 4.8	121 50.4	127.0						14.75
			127.6						14.70
			128.2						14.65
			128.8						14.65
			129.4				490.0		14.70
			130.0						14.85
			130.6						15.10
			131.1	0.32					15.11
			131.7	0.24					15.05
			132.3	0.24			434.0		14.95
			132.9	0.20					14.91
			133.5	0.16					14.75
			134.1	0.16					14.60
			134.7	0.20					14.61
			135.2	0.28			318.0		14.55
			135.8	0.32					14.51
			136.4	0.32					14.50
			137.0	0.44					14.50
			137.6	0.56					14.50
			138.2	0.60			353.0		14.45
			138.8	0.76					14.45
			139.4	0.80					14.40
			139.9	0.76					14.40
			140.5	0.68					14.40
			141.1	0.68			229.0		14.41
			141.7	0.68					14.40
			142.3	0.64					14.40
			142.9	0.78					14.35
0957	36 11.1	121 57.8	143.4	0.80					14.30
			143.9	0.42			337.0		14.30

R/V ACANIA 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			144.5	1.10					14.20
			145.0	1.20					14.20
			145.5	1.24					14.25
			146.1	1.44					14.20
			146.6	1.40			454.0		14.20
			147.1	1.34					14.20
			147.7	1.64					14.30
			148.2						14.35
			148.7						14.35
			149.2				267.0		14.40
			149.8	0.64					14.45
			150.3	0.96					14.40
			150.8	1.12					14.35
			151.4	1.44					14.20
1029	36 14.3	121 53.7	152.0	3.37			364.0		13.35
			152.6	5.30					13.20
			153.1	4.90					13.45
			153.7	2.19					14.20
			154.3	1.68					14.25
			154.9	1.40			213.0		14.25
			155.5	1.44					14.25
			156.1	1.40					14.25
			156.7	1.40					14.25
			157.3	1.44					14.20
			157.9	1.28			114.0		14.15
			158.5	1.24					14.15
			159.1	1.32					14.15
			159.7	1.40					14.15
			160.3						14.00
			160.9				102.0		13.95
			161.4						13.90
			162.0						13.80
			162.6						13.60
			163.2	5.18					13.35
1110	36 17.7	121 59.8	163.8	5.70			125.0		13.15
			164.4	4.22					13.20
			165.0	4.26					13.35
			165.6	5.18					13.00
			166.2	5.26					13.00
			166.8	7.19			175.0		12.60
			167.4	7.23					12.60
			168.0	7.15					12.60
			168.6	6.63					12.75
			169.1	5.90					12.50
1130	36 21.3	121 59.6	169.7	6.79			219.0		12.60
			170.3	6.75					12.70
			170.9	6.79					12.60
			171.5	9.28					12.10
			172.1	9.62					11.95
			172.7	8.47			285.0		12.15

R/V ACANIA 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			173.3	7.35					12.35
			173.9	6.55					12.45
			174.5	5.86					12.55
			175.1	5.62					12.60
1149	36 21.5	122 0.8	175.6	5.34			234.0		12.65
			176.2	4.86					12.75
			176.8	4.26					12.70
			177.4	4.82					12.70
			177.9	5.14					12.65
			178.5	5.10			393.0		12.65
			179.1	5.50					12.60
			179.7	5.82					12.60
			180.2	6.02					12.55
			180.8						12.55
			181.4				205.0		12.50
			182.0						12.25
			182.5						12.15
			183.1						12.10
			183.7						11.85
			184.3				115.0		13.00
			184.8						13.20
			185.4						13.30
			186.0						13.25
			186.6						13.25
			187.1				159.0		13.25
			187.7						13.20
			188.3						13.15
			188.9	6.43					12.95
			189.4	6.31					12.95
			190.0	6.43			52.0		12.85
			190.6	6.83					12.80
			191.1	6.95					12.70
			191.7	7.93					12.45
			192.3	8.43					12.35
			192.9	8.47			213.0		12.35
			193.4	8.67					12.35
			194.0	8.76					12.35
			194.6	8.27					12.45
			195.2	5.98					13.45
			195.7	3.15			57.0		14.45
			196.3	2.19					14.20
			196.9	1.12					14.55
1305	36 10.2	122 4.4	197.5	0.48					14.65
			198.0	0.21					14.70
			198.6	0.16			185.0		14.70
			199.2	0.12					14.70
			199.8	0.16					14.70
1315	36 10.1	122 5.0	200.4	0.20					14.70
			200.9	0.24					14.75
			201.5	0.44			161.0		14.60

R/V CAYUSE 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NITR. RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			202.1	0.92					14.35
			202.7	2.41					14.10
			203.3	4.31					13.95
			203.9	3.37					13.45
			204.5	6.??			215.0		13.35
			205.1						12.90
			205.7	5.76					12.90
			206.3	6.19					12.95
			206.9	5.71					12.90
			207.5	6.35			155.0		12.90
			208.1	6.55					12.75
			208.7	6.83					12.65
			209.2	6.96					12.60
			209.8	7.16					12.60
			210.4	7.21			148.0		12.55
			211.0	7.28					12.50
			211.6	7.48					12.50
			212.2	7.52					12.50
			212.8	7.64					12.45
1400	36 16.3	122 5.6	213.4	7.76			207.0		12.40
			214.0	8.01					12.35
			214.6	8.13					12.30
			215.2	8.17					12.30
			215.8	7.96					12.30
			216.4	7.68			173.0		12.25
			216.9	7.32					12.20
			217.5	7.16					12.30
1415	36 18.7	122 5.4	218.2	6.75					12.35
			218.8	6.43					12.45
			219.5	6.19			173.0		12.50
			220.2	5.99					12.50
			220.8	5.99					12.55
			221.5						12.55
			222.1						12.60
1430	36 18.8	122 8.7	222.7				204.0		12.70
			223.3						12.70
			223.9						12.70
			224.4						12.65
			225.0	6.03					12.55
			225.6	6.31			187.0		12.65
			226.2	6.23					12.60
			226.8	6.15					12.90
			227.3	5.99					13.00
			227.9	5.95					13.10
			228.5	5.83			11.0		13.15
			229.1	5.71					13.20
			229.7	5.64					13.30
			230.2	5.31					13.30
			230.8	4.95					14.00
			231.4	4.74			149.0		14.00

R/V [illegible] 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			232.0	4.56					14.10
			232.6	4.17					14.10
			233.1	2.11					14.40
			233.7	1.96					14.60
			234.3	1.84			165.0		14.70
			234.9	1.55					14.70
			235.5	1.65					14.70
			236.0	0.79					14.75
			236.6	0.36					14.80
			237.2	0.27			127.0		14.80
			237.8	0.23					14.80
			238.4	0.23					14.90
			238.9	0.23					14.80
			239.5						14.75
			240.1				241.0		14.70
			240.7						14.60
			241.3						14.55
			241.9						14.50
			242.4						14.50
			243.0				152.0		14.50
1542	36 7.6	122 9.9	243.4						14.50
			243.9	0.59					14.40
			244.3	0.55					14.40
			244.7	0.67					14.25
			245.1	0.71			172.0		14.25
			245.5	0.75					14.30
			246.0	0.99					14.30
1555	36 7.5	122 11.7	246.6	1.03					14.30
			247.1	0.87					14.35
			247.7	0.67			177.0		14.40
			248.3	0.63					14.40
			248.9	0.55					14.45
			249.4	0.47					14.55
			250.0	0.35					14.65
			250.6	0.27			224.0		14.70
			251.2	0.27					14.75
			251.7	0.27					14.75
			252.3	0.23					14.75
			252.9	0.27					14.75
			253.5	0.27			160.0		14.70
			254.1	0.35					14.65
			254.6	0.43					14.65
			255.2	0.55					14.60
			255.8	0.83					14.55
			256.3	1.27			134.0		14.40
			256.9	2.19					14.00
			257.5	2.59					13.90
			258.0	2.47					13.90
			258.6						13.60
			259.2				175.0		13.15

R/V [illegible] 29 NOVEMBER 1979 CHEMICAL MESOSCALE (CALIST X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			259.4						13.15
			260.3						13.00
			260.9						13.00
			261.5						13.00
			262.1				163.0		12.95
			262.6						13.00
			263.2						12.95
			263.8						12.85
			264.4						13.00
			264.9				142.0		12.75
			265.5						12.70
			266.1						12.70
			266.7						12.75
			267.2	4.56					12.80
			267.8	4.60			161.0		12.85
			268.4	4.56					12.90
			269.0	3.76					13.00
			269.5	3.60					13.10
			270.1	3.10					13.20
			270.7	2.71			115.0		13.30
			271.3	1.74					13.45
			271.8	1.65					13.70
			272.4	1.31					13.80
			273.0	0.95					14.00
			273.5	0.79			170.0		14.10
			274.1	0.79					14.20
1733	36 23.0	1[illegible] [illegible].3	274.7	0.75					14.15
			275.3	0.59					14.10
			275.9	0.79					14.00
			276.5	0.87			115.0		13.90
			277.1						13.75
			277.7						13.60
			278.3						13.50
			278.9						13.40
			279.5				193.0		13.25
			280.0						13.15
			280.6						13.10
			281.2						13.05
			281.8						12.90
			282.4				143.0		12.85
			283.0						12.85
			283.6						12.80
			284.2						12.75
			284.8						12.75
			285.4				128.0		12.70
			286.0						12.60
			286.6						12.50
			287.2	4.20					12.30
			287.7	5.65					12.10
			288.3				112.0		12.05

R/V [illegible] 29 NOVEMBER 1979 CHEMICAL MICROSCALE (CRUISE X)

STA NO	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			[illegible]						12.05
			285.5	6.51					12.05
			290.1	5.26					12.10
			290.7	4.59					12.20
			291.3	4.76			112.0		12.65
			291.9						12.80
			292.5						13.20
			293.1	1.12					13.25
			293.7	1.13					13.55
1840	36 13.8	122 3.8	294.3	1.92			121.0		13.50
			294.9						13.90
1843	36 13.5	122 4.4	295.5	2.55					13.80
			296.0						13.80
1847	36 14.1	122 5.5	296.6						13.40
			297.2				77.0		13.30
			297.8						13.40
			298.3						14.05
1855	36 14.6	122 4.1	298.8						14.05
			299.3						14.05
			299.8				120.0		13.85
			300.2						13.30
			300.7						13.05
			301.2						12.50
			301.7						12.35
			302.1				125.0		12.45
1912	36 12.7	122 2.8	302.8						12.40
			303.4						12.25
			304.0						12.45
			304.7						12.45
			305.3				135.0		12.60
			306.0						12.60
1923	36 11.6	122 4.7	306.5						12.65
			307.1						12.55
			307.7						12.55
			308.3				114.0		13.25
			308.8						13.25
			309.4						13.50
			310.0						13.55
			310.5						13.35
			311.1				128.0		13.20
			311.7						13.00
1943	36 13.9	122 7.3	312.2						12.70
			312.8						12.60
			313.3						12.90
			313.8				65.0		13.30
			314.4						13.40
			314.9	1.80					14.20
			315.5	1.16					14.20
			316.0	1.12					14.20
			316.5	1.16			79.0		14.30

R/V ACANIA   29 NOVEMBER 1979   CHEMICAL MESOSCALE (CRUISE X)

STA NO	LATITUDE DEG MIN	LONGITUDE DEG MIN	DISTANCE KM	SAL	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
2002	36 15.4	122 4.8	316.5	1.20					14.35
			316.5	1.24					14.35
			316.5	1.24					14.30
			316.5	1.20					14.30
			316.5	1.20					14.30
			316.5	1.14					14.30
			316.5	1.23					14.30
			316.5	1.24					14.30
			316.5	1.28					14.30
			316.5	1.24					14.30
			316.5	1.33					14.30
			316.5	1.33					14.30
			316.5	1.40					14.30
			316.5	1.40					14.30
			316.5	1.44					14.30
			316.5	1.44					14.30
			316.5	1.48					14.30
			316.5	1.48					14.30
			316.5	1.40					14.30
			316.5	1.44					14.30
			316.5	1.46					14.30
			316.5	1.56					13.90
2045	36 15.8	122 4.8	317.0	2.20					13.50
			317.4	4.01					13.10
			317.9				22.0		12.50
			318.4						12.90
			319.3						13.10
			319.3						13.20
			319.7						13.55
			320.2				108.0		13.60
			320.6						13.65
			321.1						13.90
			321.6						14.10
			322.1						14.15
			322.5				53.0		14.30
			322.9						14.60
			323.4						14.55
			323.8						14.70
			324.3						14.85
			324.7				62.0		14.85
			325.2						14.65
			325.7	1.88					14.55
			326.1	1.04					14.80
			326.6	0.80					14.50
			327.1	0.72			85.0		15.15
			327.5	0.80					15.05
2134	36 11.4	121 56.7	327.5	0.64					14.90
			327.5	0.80					14.80
			327.5	0.76					14.90
			327.5	0.80					14.80

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTS.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			227.5	0.76					14.80
			227.5	0.76					14.80
			227.5	0.76					14.80
			227.5	0.80					14.80
			227.5				57.0		14.75
			227.5						14.75
			227.5						14.70
			227.5						14.70
			227.5						14.70
			227.5						14.65
			227.5						14.65
			227.5						14.65
			227.5						14.60
			227.5						14.60
2210	36 11.4	121 59.7	227.6						14.60
			228.1						14.50
			228.5	0.80					14.60
			228.8	0.68					14.70
			229.1	0.81					14.80
			229.5	1.52			77.0		14.75
			229.9	1.4[illegible]					14.75
			230.1						14.55
			230.4						14.55
			230.7						14.55
			231.1				126.0		14.25
			231.4						14.70
			231.7						14.20
			232.1						13.30
			232.4						12.90
			232.7						12.75
2241	36 12.1	122 3.0	232.7	6.80					12.80
			232.7	6.85					12.85
			232.7	6.65					12.95
			232.7	6.61					13.00
			232.7	6.57			165.0		13.05
			232.7	6.41					13.10
			232.7	6.21					13.15
			232.7	6.19					13.20
			232.7	5.57					13.20
			232.7	5.49					13.20
			232.7						13.25
			232.7						13.25
			232.7						13.50
			232.7						13.65
2310	36 12.1	122 3.0	233.2						13.50
			233.6						13.00
			234.1						12.80
			234.6	6.13					12.60
			235.1	7.18					12.50
			235.4	7.78					12.40

R/V [illegible] 29-30 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			335.[illegible]	8.[illegible]					12.65
			336.3	7.5[illegible]					12.80
			336.[illegible]	6.81					12.90
			337.2	6.57					12.95
			337.7	6.17			135.0		13.10
			338.1						13.10
			338.5						13.10
			339.0						13.20
			339.5						13.30
			339.[illegible]				74.0		13.30
			340.4						13.20
2343	36 12.0	122 8.0	340.4						13.70
			340.4						13.65
			340.4						13.70
			340.4	3.28			65.0		13.65
			340.4	3.44					13.65
			340.4	3.64					13.65
			340.4	3.84					13.60
			340.4	3.64					13.55
			340.4	3.44					13.65
			340.4	3.36					13.65
			340.4	3.28					13.70
			340.4						13.70
			340.4						13.70
			340.4						13.70
0012	36 12.0	122 6.0	340.9						13.55
			341.4	3.28					13.40
			341.9	4.05					13.10
			342.5	5.41					13.25
			343.0	5.57			122.0		13.35
			343.5	5.41					13.35
			344.0	5.19					13.45
			344.5	4.77					13.45
			345.0						13.40
			345.6				104.0		13.20
			346.1						13.20
			346.6						13.25
			347.1						13.45
			347.6						13.10
			348.[illegible]				7.0		12.60
			348.7						12.00
0044	36 16.2	122 9.5	348.7						12.90
			348.7						12.90
			348.7	5.17					12.90
			348.7	5.21			99.0		12.90
			348.7	5.23					12.90
			348.7	5.33					12.90
			348.7	5.25					12.90
			348.7	5.17					12.90
			348.7				7.0		12.90

R/V ACANIA 30 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			348.7						12.90
			348.7						12.90
			348.7						12.90
			348.7						12.90
0110	36 16.2	122 [illegible]	349.2						12.90
			349.8						12.80
			350.3						12.80
			350.8						12.85
			351.4						12.95
			351.9				145.0		13.00
			352.4						13.05
			353.0						13.10
			353.5						13.15
			354.1						13.20
			354.6				108.0		13.15
			355.1						13.15
			355.7						13.10
0136	36 19.1	122 12.9	355.7						13.20
			355.7	3.43					13.25
			355.7	3.27			157.0		13.25
			355.7	3.40					13.20
			355.7						13.20
			355.7	3.69					13.20
			355.7	3.68					13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.20
			355.7						13.15
0215	36 19.1	122 12.9	356.2						13.10
			357.0						13.05
			357.6						12.95
			358.3						12.80
			358.9						12.80
			359.5						12.85
			360.2						12.80
			360.8						12.75
			361.5						12.80
			362.1						12.80
			362.8						12.70
			363.4						12.60
			364.1						12.55

R/V [illegible] 30 NOVEMBER 1979 CHEMICAL MESOSCALE (CHLIST X)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	CHL A MG/M3	TEMP DEG C
			264.7						12.50
			265.4						12.50
			266.[illegible]						12.50
			266.7						12.50
			267.[illegible]						12.50
			268.[illegible]						12.50
			268.6						12.50
			269.3						12.50
			269.9						12.50
0300	36 22.0	172 3.8	269.9						12.50
			269.9						12.45
			269.9						12.40
			269.9						12.40
			269.9						12.40
			269.9						12.40
			269.9						12.40
			269.9						12.55
			269.9						12.70
			269.9	7.05					12.75
			269.9	7.05					12.75
			269.9	7.					12.75
			269.9	7.09					12.75
			269.9	7.19					12.70
			269.9	7.18					12.70
0330	36 22.0	122 3.8	270.5	7.36					12.70
			271.1	7.40					12.70
			271.7	7.36					12.70
			272.3	7.75					12.70
			272.9	7.44					12.65
			273.4	7.18					12.60
			274.1	6.87					12.50
			274.6	6.65					12.50
			275.2	6.25					12.55
			275.8						12.60
			276.4						12.70
			277.1						12.75
			277.5						12.95
			278.1						12.45
			278.7						12.55
			279.3						12.60
			279.[illegible]						12.80
			280.5						13.00
			281.1						13.10
			281.6						13.20
			282.2						13.15
			282.8						13.25
			283.4						13.15
			284.0						13.15
			284.6						13.30
			285.2						13.25

47>...... END JOB HAN21916 ...... END JOB HAN21916...... END JOB HAN21916.....END JOB HAN21916.....END JOB HAN21916.....END JOB HAN21916...
47>...... END JOB HAN21916 ...... END JOB HAN21916...... END JOB HAN21916.....END JOB HAN21916.....END JOB HAN21916.....END JOB HAN21916...

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XID

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
			0.6	4.00	1.35	3.0	285.0	0.34		12.35
			1.2	3.95	1.35	2.9				12.77
			1.9	4.10	1.35	3.0				12.64
			2.5	4.24	1.35	3.1				12.04
			3.1	4.44	1.36	3.3				12.57
0300	36 13.0	122 11.7	3.7	4.73	1.36	3.5	48.0	0.09	0.49	12.54
			4.2	4.83	1.38	3.5			0.43	12.46
			4.8	5.07	1.40	3.6			0.52	12.42
			5.4	4.73					0.57	12.33
			6.0	5.35	1.51	3.9			0.71	12.33
			6.6	5.80	1.48	3.9	328.0	0.16	0.72	12.37
			7.1	5.95	1.47	4.0			0.73	12.3[illegible]
			7.7	6.05	1.47	4.1			0.68	12.37
			8.3	6.23	1.50	4.2			0.78	12.21
			8.9	6.58	1.48	4.4			0.73	12.17
			9.5	6.97	1.50	4.6	241.0	0.24	0.73	12.09
			10.1	7.27	1.55	4.7			0.83	11.77
			10.6	7.51	1.56	4.8			0.96	11.20
			11.2	8.05	1.57	5.1			1.07	11.56
			11.8	8.43	1.60	5.3			1.08	11.42
0330	36 13.6	122 9.5	12.3	8.78	1.63	5.4	258.0	0.25	1.19	11.51
			12.8	8.43	1.62	5.2			1.20	11.42
			13.3	8.73	1.63	5.4			0.93	11.10
			13.9	9.80	1.70	5.8			0.75	11.00
			14.4	10.73	1.77	6.1			0.66	11.00
			14.9	11.06	1.78	6.2	168.0	0.17	0.67	10.97
			15.4	11.31	1.80	6.3			0.82	10.91
			15.9	11.61	1.84	6.3				10.55
			16.5	12.39	1.85	6.7			1.03	10.4?
			17.0	13.02	1.90	6.9			1.28	10.3?
			17.5	13.46	1.93	7.0	380.0	0.22	1.54	10.42
			18.0	13.17	1.96	6.7			2.16	10.4?
			18.5	11.51	1.82	6.3				10.5?
			19.1	10.24	1.75	5.9			2.40	10.75
			19.6	9.65	1.71	5.6				10.85
0400	36 9.7	122 7.4	20.2	9.17	1.72	5.3	1164.0	0.19	2.52	10.9?
			20.8	9.12	1.66	5.5			2.47	10.95
			21.5						2.85	10.77
			22.1						2.98	10.7?
			22.7						2.9?	[illegible]
			23.3	8.00			1549.0	0.16	3.08	[illegible]
			24.0	8.05	1.57	5.1			3.10	10.5?
			24.6	8.14	1.59	5.1			3.04	10.77
			25.2	8.24	1.62	5.1			2.92	10.72
			25.9	8.48	1.64	5.2			2.71	10.73
			26.5	8.68	1.65	5.3	931.0	0.33	2.63	10.59
			27.1	8.87					2.54	10.57
			27.8	9.26	1.69	5.5			1.88	10.65
			28.4	9.61					1.31	10.63
			29.0	10.19	1.75	5.8			2.13	10.51

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	$\frac{\Delta ATP}{ATP}$	CHL A MG/M3	TEMP DEG C
0430	36 5.3	122 4.3	27.6	11.12	1.79	6.2	596.0	0.23	2.12	10.54
			30.1	10.82	1.76	6.1				10.63
			30.7	10.63	1.77	6.0			1.60	10.51
			31.2	10.73	1.79	6.0			1.30	10.54
			31.3	11.61	1.83	6.3			1.25	10.52
			32.3	12.09	1.85	6.5	731.0	0.25	1.14	10.70
			32.9	12.04	1.85	6.5			1.15	10.73
			33.5	11.51	1.82	6.3			1.16	11.30
			34.0	10.24	1.73	5.9			1.23	11.35
			34.5	9.95	1.72	5.8			1.17	11.33
			35.1	9.85	1.70	5.8	521.0	0.26	1.12	11.39
			35.7	9.56	1.68	5.7			0.74	11.45
			36.2	9.31	1.67	5.6			0.64	11.65
			36.8	8.53	1.63	5.2			0.66	11.80
			37.3	7.66	1.59	4.8			0.65	11.83
0500	36 1.5	122 1.3	37.9	7.02	1.53	4.6	347.0	0.33	0.65	11.73
			38.5	6.92	1.52	4.6			0.68	12.04
			39.1	6.92	1.53	4.5			0.81	12.03
			39.7						0.74	12.25
			40.2						0.73	12.32
			40.8				229.0	0.20	0.73	12.35
			41.4	4.44					0.72	12.42
			42.0	4.39	1.38	3.2			0.71	12.44
			42.6	4.14	1.36	3.0			0.71	12.45
			43.2	3.95	1.36	2.9			0.70	12.53
			43.7	3.80	1.35	2.3	214.0	0.26	0.75	12.50
			44.3	3.61	1.35	2.7			0.69	12.61
			44.9	3.56	1.35	2.6			0.66	12.63
			45.5	3.56	1.34	2.7			0.62	12.63
			46.1	3.71	1.35	2.7			0.61	12.53
0530	35 57.6	121 58.1	46.6	3.75	1.34	2.8	157.0	0.31	0.61	12.53
			47.2	3.56	1.32	2.7			0.60	13.0[illegible]
			47.8	2.78	1.28	2.2			0.54	13.13
			48.4	2.58	1.29	2.0			0.54	12.92
			49.0	2.24					0.59	12.75
			49.5	2.78	1.30	2.1	175.0	0.35	0.58	12.94
			50.1	2.58	1.30	2.0			0.58	13.10
			50.7	2.24					0.55	13.16
			51.3	2.29	1.26	1.8			0.56	13.24
			51.9	2.10	1.25	1.7			0.51	13.33
			52.4	1.61			121.0	0.33	0.50	13.37
			53.0	2.10	1.28	1.6			0.55	13.46
			53.6	2.00					0.59	13.50
			54.2	2.00					0.59	13.43
			54.8	1.95					0.53	13.40
0600	35 53.6	121 55.2	55.3	1.95	1.24	1.6	58.0	0.24	0.58	13.44
			55.9						0.53	13.47
			56.5						0.53	13.47
			57.1						0.53	13.52
			57.7		0.95				0.52	13.52

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	$\frac{\Delta ATP}{ATP}$	CHL A MG/M3	TEMP DEG C
			58.2		0.95		122.0	0.32	0.52	13.53
			58.8		0.94				0.52	13.77
			59.4		0.91				0.51	13.59
			60.0		0.91				0.51	13.55
			60.6	0.29	0.95	0.3			0.51	13.53
			61.1	0.49	0.96	0.5	86.0	0.06	0.51	13.52
			61.7	0.83	0.98	0.8			0.50	13.54
			62.3	1.02	0.97	1.1			0.55	13.52
			62.9	1.07	0.99	1.1			0.54	13.5[illegible]
			63.5	0.93	0.98	0.9			0.54	13.51
0612	35 51.9	121 54.0	63.6	0.83	0.99	0.8	173.0	0.47	0.54	13.48
			63.7	0.73	0.97	0.8			0.49	13.49
			63.9	0.88	1.00	0.9			0.53	13.48
			64.0	1.07	0.99	1.1			0.53	13.4[illegible]
			64.2	0.93	0.99	0.9			0.48	13.47
			64.3	0.73	0.99	0.7	152.0	0.33	0.49	13.47
			64.5	0.68	0.99	0.7			0.52	13.46
			64.6	1.27	1.04	1.2			0.52	13.42
			64.7	1.17	1.02	1.1			0.47	13.42
			64.9	0.93	1.02	0.9			0.47	13.44
			65.0	0.78	1.00	0.8	319.0	0.27	0.47	13.4[illegible]
			65.2	0.68	1.00	0.7			0.45	13.4[illegible]
			65.3	0.63	1.00	0.6			0.45	13.4[illegible]
			65.4	0.88	1.02	0.9			0.46	13.37
			65.6	1.12	1.06	1.1			0.45	13.46
0700	35 53.0	121 56.5	65.8	1.80	1.09	1.7	183.0	0.28	0.45	13.52
			65.9	2.10	1.09	1.9			0.45	13.53
			66.1	2.16	1.12	1.9			0.45	13.54
			66.2	2.30	1.11	2.1			0.45	13.57
			66.4	2.30	1.11	2.1			0.45	13.51
			66.6	2.30			135.0	0.46	0.45	13.50
			66.7						0.45	13.4[illegible]
			66.9						0.45	13.43
			67.0						0.45	13.43
			67.2						0.45	13.40
			67.4				226.0	0.23	0.45	13.39
			67.5						0.45	13.4[illegible]
			67.7	2.30	1.15	2.0			0.45	13.34
			67.8	2.35	1.15	2.0			0.45	13.34
			68.0	2.30	1.13	2.0			0.45	13.3[illegible]
			68.2	2.35	1.14	2.1	129.0	0.23	0.45	13.2[illegible]
			68.3	2.29	1.13	2.0			0.45	13.26
0734	35 53.9	121 57.5	68.4	2.35	1.13	2.1			0.45	13.27
			68.6	2.35	1.11	2.1			0.45	13.25
			68.7	2.35	1.12	2.1			0.45	13.24
			68.8	2.35	1.12	2.1	166.0	0.17	0.45	13.23
			68.9	2.40	1.13	2.1			0.45	13.21
			69.1	2.40	1.13	2.1			0.45	13.20
			69.2	2.40	1.13	2.1			0.45	13.20
			69.3	2.40	1.13	2.1			0.45	13.20

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
			69.4	2.40	1.14	2.1	236.0	0.23	0.45	13.2[illegible]
			69.6	2.40	1.12	2.1			0.45	13.1[illegible]
			69.7	2.40	1.14	2.1			0.45	13.16
			69.8	2.40	1.10	2.2			0.45	13.17
			69.9	2.35	1.10	2.1			0.45	13.18
0800	35 54.7	121 58.3	70.1	2.30	1.10	2.1	152.0	0.30	0.45	13.20
			70.2	2.30	1.11	2.1			0.45	13.21
			70.3	2.30	1.11	2.1			0.44	13.20
			70.5	2.35	1.14	2.1			0.44	13.20
			70.6	2.35	1.13	2.1			0.43	13.14
			70.7	2.35	1.13	2.1	156.0	0.35	0.43	13.17
			70.9	2.40	1.14	2.1			0.42	13.15
			71.0	2.40	1.12	2.1			0.42	13.14
			71.1	2.40	1.12	2.1			0.42	13.13
			71.3	2.40	1.08	2.2			0.41	13.17
			71.4	2.35	1.09	2.2	221.0	0.30	0.41	13.16
			71.6	2.35	1.10	2.1			0.44	13.15
			71.7	2.40	1.10	2.2			0.44	13.14
			71.8	2.40	1.11	2.2			0.43	13.16
			72.0	2.40	1.11	2.2			0.43	13.17
0830	35 55.6	121 59.1	72.1	2.30	1.13	2.0	126.0	0.30	0.42	13.21
			72.2	2.30	1.11	2.1			0.42	13.21
			72.4	2.25	1.11	2.0			0.41	13.22
			72.5	2.25	1.10	2.0			0.41	13.22
			72.6	2.20	1.09	2.0			0.40	13.22
			72.8	2.20	1.11	2.0	157.0	0.31	0.40	13.23
			72.9	2.25	1.11	2.0			0.39	13.23
			73.0	2.25	1.08	2.1			0.39	13.24
			73.2	2.25	1.09	2.1			0.38	13.25
			73.3	2.30	1.10	2.1			0.38	13.24
			73.5	2.30	1.10	2.1			0.37	13.25
			73.6	2.25	1.12	2.0			0.37	13.25
			73.7	2.30	1.11	2.1			0.36	13.21
			73.9	2.30	1.12	2.1			0.36	13.20
			74.0	2.30	1.12	2.1			0.36	13.20
0900	35 56.4	122 0.0	74.1	2.30	1.12	2.1	121.0	0.19	0.36	13.17
			74.3	2.35	1.13	2.1			0.33	13.1[illegible]
			74.4	2.40					0.34	13.17
			74.5	2.40	1.13	2.1			0.34	13.16
			74.7	2.40	1.15	2.1			0.38	13.1[illegible]
			74.8	2.64	1.16	2.3			0.39	13.1[illegible]
			74.9	2.74	1.18	2.3			0.39	13.04
			75.1						0.36	13.02
			75.2						0.40	12.9[illegible]
			75.4						0.41	12.9[illegible]
			75.5				155.0	0.16	0.41	12.90
			75.6						0.42	12.89
			75.8						0.42	12.8[illegible]
			75.9						0.43	12.8[illegible]
			76.0						0.43	12.85

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
			76.2						0.47	12.32
			76.3						0.44	12.31
			76.4						0.45	12.30
0936	35 57.4	122 1.1	76.6						0.49	12.79
			76.7						0.50	12.78
			76.8				179.0	0.27	0.50	12.69
			76.9						0.51	12.72
			77.1						0.51	12.73
			77.2						0.52	12.72
			77.3						0.52	12.75
			77.4						0.53	12.71
			77.6						0.54	12.70
			77.7						0.54	12.55
			77.8						0.55	12.65
			77.9	3.37	1.37	2.5			0.55	12.53
1000	35 57.9	122 1.9	78.0	3.68	1.35	2.7	148.0	0.29	0.70	12.50
			78.2	3.83	1.35	2.8			0.71	12.41
			78.3	4.03	1.35	3.0			0.72	12.37
			78.4	4.13	1.35	3.1			0.63	12.30
			78.5	4.29	1.37	3.1			0.59	12.11
			78.7	4.59	1.39	3.4			0.70	12.52
			78.8	5.05	1.39	3.6			0.70	12.43
			78.9	5.15	1.39	3.7			0.71	12.30
			79.0	5.51	1.40	3.9			0.72	12.27
			79.2	5.56	1.41	3.9			0.73	12.35
			79.3	5.56	1.43	3.9	233.0	0.30	0.73	12.34
			79.4	5.66	1.43	4.0			0.74	12.32
			79.5	5.61	1.43	3.9			0.75	12.27
			79.7	6.02	1.45	4.2			0.76	12.21
			79.8	6.53	1.48	4.4			0.77	12.15
1030	35 58.6	122 2.8	79.9	6.93	1.53	4.5			0.83	12.15
			80.1	7.13	1.53	4.7			0.84	11.92
			80.2	8.15	1.58	5.2			0.85	11.93
			80.4	8.00	1.55	5.2			0.85	11.92
			80.5	7.95	1.57	5.1			0.86	11.92
			80.7	7.90	1.54	5.1	169.0	0.31	0.87	11.93
			80.9	7.90	1.56	5.1			0.88	11.93
			81.0	7.80	1.55	5.0			0.89	11.92
			81.2	7.84	1.54	5.1			0.90	11.81
			81.3	7.85	1.54	5.1			0.91	11.90
			81.5	7.74	1.54	5.0			0.92	11.91
			81.6	7.79	1.52	5.1			0.93	11.87
			81.8	7.79	1.52	5.1			0.94	11.75
			81.9	7.74	1.52	5.1			0.95	11.76
			82.1	7.69	1.53	5.0			0.95	11.97
			82.2	7.64	1.53	5.0	147.0	0.27	0.77	11.89
1102	35 59.4	122 4.1	82.4	7.59	1.52	5.0			0.77	12.00
			82.6	7.69	1.52	5.1			0.77	11.99
			82.7	7.69	1.52	5.1			0.77	11.97
			82.9	7.69	1.54	5.0			0.95	12.00

R/V ACANIA   10 JUNE 1980   CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	$\frac{\Delta ATP}{ATP}$	CHL A MG/M3	TEMP DEG C
			83.0	7.69	1.51	5.1			0.77	12.02
			83.2	7.64	1.49	5.2			0.77	12.03
			83.3	7.59	1.52	5.0			0.77	12.03
			83.5	7.54	1.54	4.9			0.77	12.03
			83.6	7.40	1.52	4.9			0.77	12.03
			83.8	7.44	1.53	4.9	288.0	0.32	0.77	12.04
			83.9	7.44	1.53	4.9			0.77	12.05
			84.1	7.39	1.52	4.9			0.77	12.06
			84.3	7.44	1.52	4.9			0.77	12.08
1128	36 0.1	122 5.1	84.4	7.39	1.52	4.9			0.77	12.05
			84.5	7.44	1.52	4.9	322.0	0.29	0.77	12.04
			84.7	7.49	1.52	4.9			0.71	12.03
			84.8	7.54	1.51	5.0			0.71	12.01
			85.0	7.49	1.52	4.9			0.71	12.00
			85.1	7.34	1.51	4.9			0.71	11.99
			85.3	7.44	1.52	4.9	203.0	0.22	0.71	11.99
			85.4	7.49	1.52	4.9			0.71	12.00
			85.6	7.29	1.51	4.8			0.71	12.01
			85.7	7.29	1.50	4.9			0.71	12.02
			85.9	7.29	1.50	4.9			0.71	12.05
			86.0	7.29	1.50	4.9			0.71	12.05
			86.2	7.29	1.49	4.9			0.71	12.10
			86.3	7.29	1.51	4.8			0.71	12.13
			86.5	7.24	1.50	4.8			0.71	12.12
			86.6	7.13	1.51	4.7			0.70	12.12
1200	36 1.0	122 6.1	86.8				275.0	0.37	0.72	12.12
			87.0						0.73	12.11
			87.3						0.74	12.10
			87.5						0.75	12.09
			87.7						0.76	12.07
			87.9						0.70	12.04
			88.1						0.78	12.07
			88.3						0.79	12.05
			88.5						0.73	12.07
			88.7						0.74	12.07
			88.9				215.0	0.33	0.82	12.05
			89.1						0.83	12.02
			89.4	6.93	1.55	4.5			0.77	12.01
			89.6	6.98	1.52	4.6			0.92	12.00
			89.9	6.93	1.51	4.6			0.85	12.00
1230	36 2.5	122 7.3	90.0	6.98	1.51	4.6			0.87	12.00
			90.2	6.93	1.51	4.6			0.88	12.00
			90.4	6.93	1.50	4.6			0.89	12.01
			90.6	6.88	1.49	4.6			0.90	12.01
			90.8	6.93	1.49	4.6			0.91	12.01
			91.0	6.83	1.51	4.6	169.0	0.29	0.85	12.01
			91.2	6.88	1.50	4.6			0.86	11.99
			91.4	6.88	1.52	4.5			1.02	11.97
			91.5	7.03	1.53	4.6			1.12	11.92
			91.7	7.18	1.55	4.6			1.13	11.92

R/V ACANIA   10 JUNE 1980   CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
			91.9	7.03	1.54	4.6			1.22	11.93
			92.1	7.03	1.55	4.5			1.32	11.95
			92.3	7.08	1.54	4.6			1.42	11.95
			92.5	7.03	1.55	4.5			1.43	11.97
			92.7	6.52					1.44	11.95
1300	36 3.8	122 8.4	92.9				270.0	0.37	1.44	11.97
			93.2						1.34	12.00
			93.4						1.33	12.00
			93.6	6.78	1.43	4.7			1.41	12.00
			93.8	6.83	1.49	4.6			1.40	12.01
			94.0	6.93	1.46	4.7			1.39	12.00
			94.2	6.93	1.46	4.7			1.38	11.97
			94.5	7.08	1.45	4.9			1.37	11.94
			94.7	7.08	1.47	4.8			1.36	11.90
			94.9	7.24	1.45	5.0			1.35	11.87
			95.1	7.18	1.47	4.9	435.0	0.38	1.34	11.85
			95.3	7.29	1.47	5.0			1.25	11.82
			95.5	7.39	1.48	5.0			1.24	11.81
			95.8	7.44	1.51	4.9			1.23	11.80
			96.0	7.54	1.49	5.1			1.22	11.77
1330	36 5.2	122 9.7	96.2	7.64	1.52	5.0			1.14	11.73
			96.4	7.74	1.52	5.1			1.13	11.72
			96.7	7.90	1.53	5.2			1.12	11.70
			96.9	8.00	1.55	5.2			1.11	11.55
			97.1	8.15	1.54	5.3			1.10	11.57
			97.4	8.66	1.59	5.4	272.0	0.41	1.02	11.52
			97.6	9.78	1.65	5.9			0.94	11.30
			97.9	9.88	1.66	6.0			0.86	11.28
			98.1	10.03	1.66	6.0			0.86	11.13
			98.3	10.34	1.66	6.2			0.85	11.16
			98.6	10.29	1.66	6.2			0.84	11.12
			98.8	10.49	1.68	6.2			0.84	11.03
			99.0	10.39	1.68	6.2			0.90	11.13
			99.3	10.44	1.67	6.3			0.89	11.07
			99.5	10.54	1.71	6.2			0.95	11.03
1400	36 6.7	122 11.2	99.7				315.0	0.35		11.07
			99.9							11.06
			100.2							11.09
			100.4							11.07
			100.6							11.09
			100.8							11.10
			101.0	10.23	1.74	5.9				11.04
			101.3	10.39	1.77	5.9				11.00
			101.5	10.54	1.76	6.0				11.00
			101.7	10.64	1.75	6.1				11.00
			101.9	10.59	1.76	6.0	308.0	0.34		11.03
			102.2	10.64	1.75	6.1				11.03
			102.4	10.54	1.74	6.1				11.02
			102.6	10.54	1.74	6.1				11.06
			102.8	10.49	1.77	5.9				11.08

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
1430	36 8.0	122 12.7	103.1	10.39	1.76	5.9				11.00
			103.3	10.34	1.75	5.9				11.17
			103.6	10.23	1.75	5.8				11.10
			103.9	10.23	1.76	5.8				11.01
			104.1	10.18	1.76	5.8				10.97
			104.4	10.25	1.76	5.8				[illegible]
			104.6	10.29	1.75	5.9				10.96
			104.9	9.98	1.72	5.8				11.10
			105.2	9.57	1.62	5.9				11.30
			105.4	9.01	1.61	5.6				11.30
			105.7	8.81	1.57	5.6				11.31
			105.9	8.96	1.57	5.7				11.34
			106.2	8.86	1.57	5.6				11.35
			106.5	8.66	1.56	5.6				11.40
			106.7	8.56	1.54	5.6				11.46
1500	36 9.4	122 14.7	107.1	8.30	1.53	5.4	250.0	0.42		11.49
			107.4	8.52	1.53	5.6				11.50
			107.8	8.20	1.53	5.4				11.50
			108.1	8.10	1.51	5.4				[illegible]
			108.5	7.95						[illegible]
			108.8	8.05						11.53
			109.2	7.49						[illegible]
			109.5	8.10						[illegible]
			109.9	8.25						11.54
			110.2	7.95	1.50	5.3				11.34
			110.6	8.30	1.54	5.4	91.0	0.41		11.40
			110.9	8.10	1.50	5.4				11.42
			111.3	8.20	1.53	5.4				11.41
			111.6	8.20	1.56	5.3				11.35
			112.0	8.25	1.55	5.3				11.20
			112.3	8.66	1.59	5.4	232.0	0.37		10.84
			112.7	9.73	1.66	5.9				10.85
			113.0	9.57	1.65	5.8				10.82
			113.4	9.93	1.68	5.9				10.80
			113.8	9.93	1.70	5.9				10.75
			114.1	10.34	1.71	6.0				10.76
			114.5	10.29	1.74	5.9				10.70
			114.8	10.49	1.73	6.1				10.53
			115.2	10.59	1.73	6.1	223.0	0.60		10.55
			115.5	10.95	1.76	6.2				10.50
			115.9	11.45	1.78	6.4				10.37
			116.2	11.86	1.79	6.6				10.42
			116.6	11.71	1.79	6.5				10.46
			116.9	10.79	1.79	6.0				10.43
			117.3	11.61	1.78	6.5				10.49
			117.6	11.66	1.81	6.4	235.0	0.39		10.42
			118.0	10.44						10.65
			118.3	9.83	1.68	5.9				10.72
			118.7	9.22	1.65	5.6				10.74
			119.0	8.61						10.76

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
			118.4	8.35	1.61	5.2				10.74
1612	36 7.3	122 6.6	119.9	8.45	1.59	5.3				10.70
			120.3	8.00	1.59	5.0				10.67
			120.3				547.0	0.42		10.64
			121.3							10.59
			121.7							10.59
			122.2							10.59
			122.7							10.50
			123.1							[illegible]
			123.6							10.57
1630	36 6.9	122 3.9	124.0				599.0	0.16		10.70
			124.4							10.73
			124.8	8.05	1.57	5.1				[illegible]
			125.2	8.81	1.65	5.3				[illegible]
			125.6	8.66						[illegible]
			126.0	8.30			250.0	0.37		11.06
			126.4	9.12						[illegible]
			126.8	9.17						11.14
			127.2	9.47	1.62	5.8				11.15
			127.6	9.68	1.62	6.0				11.16
			128.0	10.08	1.63	6.2				11.17
			128.4	10.13	1.63	6.2				[illegible]
			128.8	10.18	1.65	6.2				11.17
			129.2	9.88	1.65	6.0				11.17
			129.6	10.23	1.66	6.2				11.15
1700	36 6.6	121 59.9	130.1	10.18	1.66	6.1	313.0	0.22		11.15
			130.5	10.39	1.66	6.3				11.12
			131.0	10.54	1.69	6.2				11.10
			131.4							[illegible]
			131.9	10.79	1.71	6.3				11.04
			132.3	11.10	1.72	6.5				10.97
			132.8	11.25	1.74	6.5				[illegible]
			133.2	11.45	1.74	6.6				[illegible]
			133.7	11.35	1.73	6.6	286.0	0.35		11.02
			134.1	11.00	1.72	6.4				11.00
			134.6							10.94
			135.0	9.78	1.63	6.0				10.97
			135.5	9.73						10.85
			135.9		1.71					10.85
			136.4	10.69	1.68	6.4				[illegible]
1730	36 6.2	121 55.4	136.8	11.15	1.70	6.6	279.0	0.31		10.81
			137.3	10.90	1.71	6.4				10.80
			137.8	8.71						10.77
			138.2	10.90	1.72	6.3				[illegible]
			138.7						1.00	10.62
			139.2	10.74	1.73	6.2			0.92	10.60
			139.6	10.95	1.70	6.4			0.91	10.51
			140.1	11.91	1.78	6.7			0.86	10.54
			140.6	11.71	1.75	6.7	338.0	0.28	1.01	[illegible]
			141.0						1.00	10.42

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
			141.5	11.15					1.17	10.30
			141.9						1.21	10.23
			142.4						1.26	10.21
			142.9	12.52	1.77	7.1			1.36	10.16
			143.3	13.44	1.81	7.4			1.40	10.03
			143.8	13.94	1.88	7.4	291.0	0.34	1.32	10.04
1802	36 5.4	121 50.7	144.2	13.44	1.90	7.3			1.02	10.03
			144.7	14.66	1.96	7.5			0.95	9.74
			145.2						0.88	9.70
			145.6	16.49	2.22	7.4			0.81	9.26
			146.1	17.56	2.18	8.1	184.0	0.34	0.64	9.39
			146.5	17.76	2.16	8.2			0.63	9.47
			147.0	17.91	2.18	8.2			0.62	9.53
			147.4	17.50	1.97	8.9			0.61	9.62
			147.9	16.54	2.11	7.8			0.60	9.53
			148.4	16.49	2.10	7.9	239.0	0.30	0.59	9.54
			148.8						0.58	9.54
			149.3	16.08	2.08	7.7			0.57	9.70
			149.7	15.89	2.11	7.5			0.56	9.55
1828	36 4.9	121 46.6	150.1	16.08	2.13	7.5			0.46	9.60
			150.4	15.57	2.01	7.7	146.0	0.33	0.36	9.53
			150.7	15.27	2.02	7.6			0.35	9.65
			151.0						0.34	9.55
			151.3	16.02	2.10	7.6			0.38	9.72
1838	36 4.8	121 45.6	151.7	16.13	2.07	7.8			0.33	9.73
			152.0	16.08	2.05	7.8	133.0	0.42	0.33	9.30
			152.3	15.93	2.05	7.8			0.32	9.50
			152.6	15.93	2.02	7.9			0.31	9.30
			152.9	15.73	2.02	7.8			0.31	9.31
			153.3	15.72	2.02	7.8			0.30	9.42
			153.6	15.67	2.03	7.7	205.0	0.29	0.29	9.34
			153.9	15.78	2.04	7.7			0.29	9.55
			154.2	15.57	2.07	7.5			0.23	9.34
			154.5	16.87	2.15	7.9			0.31	9.37
			154.9	17.05	2.15	7.9			0.30	9.93
			155.2	16.87	2.16	7.8	199.0	0.53	0.29	9.15
			155.5	16.94	2.18	7.8			0.32	9.43
			155.8	17.71	2.24	7.9			0.37	9.[illegible]
1906	36 4.5	121 48.6	156.2	18.81	2.24	8.4			0.42	9.58
			156.6	18.37	2.26	8.1			0.38	9.56
			157.0	18.37	2.27	8.1	285.0	0.19	0.47	9.54
			157.4	18.67	2.27	8.2			0.33	9.53
			157.8	18.82	2.23	9.3			0.30	9.49
			158.2	15.57	2.09	7.4			0.26	9.40
			158.6	14.10	2.03	6.9			0.23	10.04
			158.9	13.69			351.0	0.38	0.23	10.12
			159.3	13.54	1.92	7.1			0.36	10.20
			159.7	13.39	1.92	7.0			0.37	10.26
			160.1	13.03	1.93	6.8			0.38	10.31
			160.5	13.18	1.89	7.0			0.34	10.40

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
1930	36 3.7	121 51.6	160.9	12.42	1.86	6.7	346.0	0.40	0.35	10.43
			161.3						0.33	10.54
			161.7						0.32	10.53
			162.1						0.31	10.50
			162.4						0.29	10.50
			162.8				378.0	0.40	0.26	10.64
			163.2						0.26	10.57
			163.6						0.24	10.60
			164.0						0.21	10.55
			164.4						0.20	10.72
			164.8				320.0	0.40	0.17	10.83
			165.2						0.13	11.00
			165.6						0.09	11.22
			165.9						0.09	11.51
			166.3						0.08	11.66
2000	36 2.3	121 55.0	166.7				139.0	0.29	0.63	11.80
			167.0	6.30	1.52	4.1			0.56	11.70
			167.4	6.06	1.48	4.1			0.56	12.05
			167.7	5.91	1.42	4.2			0.56	12.03
			168.1	5.96	1.41	4.2			0.56	12.10
			168.4	6.01	1.39	4.3	240.0	0.22	0.56	12.11
			168.8	6.16	1.40	4.4			0.56	12.12
			169.1	6.21	1.39	4.5			0.63	12.12
2016	36 1.6	121 56.7	169.4	6.45	1.42	4.5			0.63	12.08
			169.8	6.65	1.42	4.7			0.70	12.07
			170.1	6.75	1.43	4.7	158.0	0.24	0.70	12.03
			170.4	6.75	1.42	4.8			0.70	12.00
			170.7	6.90	1.43	4.8			0.70	11.97
			171.0	7.15	1.44	5.0			0.70	11.90
			171.3	7.44	1.48	5.0			0.70	11.80
2030	36 2.8	121 55.6	171.6	7.79	1.49	5.2	352.0		0.70	11.70
			172.0	8.34	1.51	5.5			0.70	11.63
			172.4	9.03	1.56	5.8			0.70	11.43
			172.8	9.13	1.57	5.8			0.71	11.40
			173.1	9.18	1.58	5.8			0.71	11.35
			173.5	9.67	1.61	6.0	135.0	0.32	0.71	11.25
			173.9	10.52	1.68	6.3			0.71	11.10
			174.3	10.66	1.68	6.3			0.78	11.00
			174.7	10.71	1.68	6.4			0.78	10.99
			175.0	10.76	1.66	6.5			0.78	10.91
			175.4	10.76	1.69	6.4	103.0	0.31	0.99	10.97
			175.8	10.27	1.63	6.3			1.07	11.12
			176.2	10.17	1.64	6.2			1.14	11.13
			176.5	10.22	1.66	6.2			1.07	11.19
			176.9	10.52	1.65	6.4			1.07	11.14
2100	36 5.8	121 55.6	177.3	10.66	1.67	6.4	279.0	0.23	1.07	11.03
			177.7	10.76	1.67	6.4			1.00	11.02
			178.1	10.76	1.67	6.4			1.00	11.03
			178.5	10.86	1.66	6.5			1.00	11.04
			178.9	10.86	1.69	6.4			1.00	10.93

R/V ACANIA 10 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
			179.4	11.11	1.69	6.6	157.0	0.30	1.03	10.75
			179.8	11.41	1.72	6.6			1.02	11.05
			180.2	11.71	1.74	6.7			0.93	11.00
			180.6	12.10	1.78	6.8			0.86	10.93
			181.0	12.35	1.80	6.9			0.93	10.30
2120	36 7.9	121 55.4	181.3	12.50	1.84	6.8	124.0	0.34	0.93	10.70
			181.5	12.65	1.82	7.0			0.93	10.55
			181.8	12.75	1.82	7.0			0.93	10.64
			182.0	12.50	1.78	7.0			0.94	10.64
			182.3	12.05	1.78	6.8			1.15	10.76
2130	36 7.8	121 56.2	182.7	12.35	1.82	6.8	246.0	0.38	1.01	10.35
			183.0	12.30	1.78	6.9			1.01	10.60
			183.4	12.25	1.81	6.8			1.01	10.34
			183.8	12.10	1.78	6.8			1.01	10.47
			184.1	11.95	1.78	6.7			1.01	11.02
			184.5	11.90	1.78	6.6	200.0	0.35	1.01	11.09
			184.9	11.75	1.75	6.7			0.94	11.16
			185.2	11.26	1.74	6.5			1.01	11.13
			185.6	10.81	1.72	6.3			1.02	11.24
			186.0	10.66	1.71	6.2			1.02	11.32
			186.3	10.52	1.71	6.2	223.0	0.27	1.09	11.37
			186.7	10.32	1.69	6.1			1.09	11.35
			187.0	10.37	1.66	6.2			1.09	11.34
			187.4	10.52	1.67	6.3			1.24	11.24
2158	36 6.7	121 59.3	187.8	10.52	1.68	6.3			1.46	11.17
			188.2	10.07	1.65	6.1	295.0	0.36	2.19	10.[illegible]
			188.6	8.93	1.60	5.6			2.54	10.90
			189.0	8.68	1.61	5.4			2.78	10.94
			189.4	8.19	1.55	5.3			2.93	10.[illegible]
			189.9	7.99	1.54	5.2			2.93	11.00
			190.3	7.79	1.50	5.2	786.0	0.33	2.93	11.03
			190.7	7.79	1.52	5.1			2.79	11.05
			191.1	7.89	1.52	5.2			2.72	11.05
			191.5	8.19					2.57	11.05
			191.9	8.29	1.59	5.2			2.43	11.10
			192.3	8.93	1.59	5.6	518.0	0.38	1.03	11.40
			192.7	8.93	1.57	5.7			0.95	11.00
			193.1	7.89	1.55	5.1			1.05	12.00
			193.5	7.79	1.52	5.1			0.96	12.02
			193.9	7.84	1.56	5.0			0.96	11.00
2230	36 3.2	121 59.9	194.4	7.59	1.52	5.0			1.03	12.02
			194.8	7.30	1.52	4.8			0.88	12.06
			195.3	7.15	1.50	4.8			0.86	12.01
			195.7	7.15	1.50	4.8			0.88	12.14
			196.2	7.10	1.50	4.7			0.89	12.13
			196.6	7.10	1.48	4.8	296.0	0.30	0.81	12.15
			197.1	7.20	1.47	4.9			0.81	12.18
2244	36 1.5	121 59.9	197.4	7.15	1.50	4.9			0.81	12.20
			197.7	7.05	1.48	4.8			0.81	12.18
			197.9	6.95	1.43	4.7			0.81	12.15

R/V ACANIA 10-11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	$\frac{\Delta ATP}{ATP}$	CHL A MG/M3	TEMP DEG C
			198.2	6.90	1.47	4.7	152.0	0.26	0.81	12.15
			198.5	6.90	1.48	4.7			0.82	12.12
			198.8	6.65	1.47	4.7			0.82	12.11
			199.1	6.90	1.48	4.7			0.82	12.05
			199.4	6.90	1.49	4.6			0.82	12.17
			199.6	7.00	1.47	4.8	146.0	0.24	0.82	12.19
			199.9	6.26	1.47	4.3			0.82	
			200.2	6.55	1.48	4.4			0.82	
			200.5	6.35	1.44	4.4			0.82	
			200.8	6.26	1.45	4.3			0.82	
2310	36 3.0	122 1.6	201.1	6.21	1.43	4.3	113.0	0.24	0.82	
			201.3	6.11	1.44	4.2			0.82	
			201.6	6.06	1.45	4.2			0.82	
			201.9	6.06	1.45	4.2			0.82	
			202.2	6.06	1.45	4.2			0.82	
			202.4	6.11	1.45	4.2	117.0	0.23	0.82	
			202.7	6.21	1.45	4.3			0.82	
			203.0	6.30	1.45	4.3			0.82	
			203.3	6.35					0.82	
			203.6						0.83	
2330	36 4.3	122 2.5	203.8				182.0	0.16	0.83	
			204.1						0.83	
			204.4						0.83	
			204.7						0.90	
			204.9	7.15	1.55	4.6			0.98	
			205.2	7.44	1.52	4.9	215.0	0.31	0.98	
			205.5	7.54	1.50	5.0			1.06	
			205.8	7.59	1.50	5.1			1.06	12.25
			206.1	7.84	1.51	5.2			1.06	12.22
			206.3	7.94	1.54	5.2			1.06	12.05
			206.6	10.57	1.52	7.0	295.0	0.11	1.06	12.00
			206.9	10.81	1.53	7.1			1.14	11.35
			207.2	9.33	1.56	6.0			1.14	11.61
			207.4	9.53	1.60	6.0			1.14	11.50
			207.7	9.87	1.62	6.1			1.21	11.37
0000	36 6.2	122 3.9	208.1	10.12	1.64	6.2	207.0	0.33	1.26	11.35
			208.4	10.17	1.65	6.2			1.21	11.31
			208.8	10.37	1.69	6.1			1.21	11.29
			209.2	10.52	1.69	6.2			1.21	11.24
			209.5	10.81	1.72	6.3			1.21	11.24
			209.9	11.01			211.0	0.34	1.21	11.20
			210.3	11.01	1.73	6.4			1.20	11.16
			210.6	11.35	1.74	6.5			1.20	11.05
			211.0	11.41	1.73	6.6			1.28	10.93
			211.4	9.67	1.65	5.9			1.35	11.07
			211.7	9.33	1.64	5.7	347.0	0.47	1.42	11.10
			212.1	9.62	1.65	5.8			2.77	11.21
			212.5	9.67	1.65	5.9			2.77	11.22
			212.8	10.02	1.66	6.0			2.54	11.20
			213.2	10.17	1.69	6.0			2.32	11.19

R/V ACANIA   11 JUNE 1980   CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
0030	36 3.6	122 6.0	213.6	10.52	1.70	6.2	497.0	0.36	2.10	11.17
			213.9	10.57	1.68	6.3			1.86	11.16
			214.3	10.52	1.67	6.3			1.73	11.14
			214.7	10.32	1.68	6.1			1.78	11.12
			215.0	10.07	1.67	6.0			1.93	11.09
			215.4	9.92	1.67	5.9	421.0	0.41	2.07	11.04
			215.8	9.92	1.67	5.9			2.29	11.00
			216.1	9.92	1.65	6.0			2.49	10.95
			216.5	10.37	1.67	6.2			2.65	10.92
			216.9	10.17	1.69	6.0			2.80	10.89
			217.3	10.37	1.69	6.1	528.0	0.36	2.87	10.82
			217.6	10.52	1.71	6.2			2.87	10.75
			218.0	10.57	1.70	6.2			2.87	10.75
			218.4	10.37	1.68	6.2			4.00	10.74
			218.7	10.32	1.69	6.1			2.86	10.73
0100	36 10.9	122 8.4	218.9				560.0	0.37	2.93	10.72
			219.1	10.17	1.67	6.1			2.93	10.73
			219.3	10.27	1.67	6.1			2.99	10.78
			219.4	10.22	1.68	6.1			3.06	10.79
			219.6	10.27	1.69	6.1			2.99	10.72
			219.8	10.62	1.70	6.2	183.0	0.45	3.06	10.50
			220.0	11.26	1.75	6.4			2.63	10.47
			220.1	12.19	1.79	6.8			2.68	10.41
			220.3	12.70	1.82	7.0			2.39	10.29
			220.5	13.74	1.89	7.3			2.17	10.12
			220.6	14.53	1.92	7.6	278.0	0.47	1.95	10.13
			220.8						1.94	10.17
			221.0						1.94	10.27
			221.2	13.54	1.80	7.5			1.94	10.33
			221.3	13.54	1.80	7.5			2.01	10.36
0130	36 11.7	122 9.9	221.5	13.39	1.80	7.4	431.0	0.37	2.01	10.30
			221.6	13.29	1.81	7.3			1.57	10.25
			221.8	13.64	1.83	7.5			1.57	10.24
			222.0	13.39	1.82	7.4			1.57	10.43
			222.1	12.75	1.77	7.2			1.57	10.44
			222.3	12.70	1.78	7.1	297.0	0.37	1.49	10.50
			222.4	12.20	1.74	7.0			1.55	10.55
			222.6	11.85	1.72	6.9			1.70	10.50
			222.7	12.05	1.73	7.0			1.64	10.49
			222.9	12.40	1.74	7.1			1.70	10.55
			223.0	12.30	1.73	6.9	267.0	0.39	1.55	10.80
			223.2	11.36	1.70	6.7			1.62	10.83
			223.3	11.06	1.69	6.5			1.48	10.88
			223.5	10.91	1.68	6.5			1.20	11.00
			223.6	11.01	1.68	6.6			1.18	11.02
0200	36 12.3	122 11.3	223.9				152.0	0.22	1.12	10.93
			224.1						1.12	10.99
			224.3						1.11	10.87
			224.5						1.11	10.83
			224.7						1.17	10.54

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
			224.9				57.0	0.01	1.71	10.97
			225.1	11.36	1.80	6.3			1.23	1[illegible]
			225.3	9.43	1.59	6.0			1.16	11.04
			225.5	10.71	1.73	6.2			1.16	11.00
			225.7	8.33	1.62	5.5			1.15	10.67
			226.0	11.06	1.70	6.5	327.0	0.36	1.21	10.30
			226.2	11.80	1.75	6.7			1.48	10.33
			226.4	13.07	1.84	7.1			1.47	10.10
			226.6	13.59	1.86	7.4			1.47	10.03
			226.8	14.43	1.95	7.4			1.40	10.04
0230	36 12.2	122 9.2	227.1	14.03	1.93	7.3	332.0	0.42	1.46	10.13
			227.5	14.38	1.94	7.4			1.53	10.10
			227.8	13.04	1.84	7.1			1.64	10.13
			228.2	14.78	1.95	7.6			1.64	9.95
			228.5	14.63	1.96	7.5			1.70	10.05
			228.9	14.18	1.99	7.1	455.0	0.41	1.75	10.10
			229.2	14.03	1.91	7.3			1.75	10.31
			229.6	13.79	1.93	7.1			1.80	10.52
			229.9	11.90	1.79	6.6			2.28	10.58
			230.3	11.16	1.73	6.5			2.56	10.70
			230.6	10.66	1.72	6.2	675.0	0.33	2.42	10.71
			230.9						2.35	10.72
			231.3	11.66	1.74	6.7			2.21	10.74
			231.6						2.14	10.79
			232.0						1.98	10.61
0300	36 11.9	122 5.7	232.3	11.66	1.75	6.7	360.0	0.41	2.06	10.62
			232.7	11.71	1.76	6.7			2.05	10.77
			233.1	10.71	1.77	6.1			1.98	10.74
			233.4	11.80	1.77	6.7			2.03	10.74
			233.8	11.56	1.77	6.5			2.03	10.7[illegible]
			234.1	12.80			654.0	0.28	2.04	10.7[illegible]
			234.5	14.93	1.77	8.4			2.01	10.73
			234.8	13.39	1.76	7.9			1.94	10.6[illegible]
			235.2	13.49	1.76	7.7			1.81	10.55
			235.5	15.42	1.78	8.7			1.80	10.63
			235.9	17.60	1.79	9.8	584.0	0.25	1.73	10.57
			236.3	18.20	1.79	10.2			1.67	10.5[illegible]
			236.6		1.80				1.70	10.53
			237.0						1.53	10.5[illegible]
			237.4						1.53	10.47
0330	36 11.9	122 2.1	237.6				261.0	0.28	1.53	10.47
			237.9		1.86				1.52	10.42
			238.1		1.86				1.51	10.44
			238.4		1.86				1.55	10.44
			238.7		1.88				1.62	10.44
			238.9				434.0	0.29	1.61	10.35
			239.2						1.54	10.24
			239.5						1.14	9.[illegible]
			239.7						0.90	9.65
			240.0						0.90	9.64

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE (KM)	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP / ATP	CHL A MG/M3	TEMP DEG C
			240.3				183.0	0.23	1.07	9.72
			240.5						1.16	[illegible]
			240.8						0.94	9.57
			241.1						0.88	[illegible]
			241.3						0.85	9.33
0400	36 11.7	121 59.5	241.5				146.0	0.28	0.82	9.30
			241.7						0.82	9.23
			241.9	18.59	2.29	8.1			0.81	9.23
			242.0	18.79	2.23	8.4			0.86	9.20
			242.2	19.04	2.27	8.4			0.86	9.13
			242.4	18.94	2.28	8.3	231.0	0.18	0.85	[illegible]
			242.5	19.29	2.28	8.5			0.85	[illegible]
			242.7	19.48	2.23	8.5			[illegible]	[illegible]
			242.9	19.68	2.31	8.5			[illegible]	9.04
			243.1	19.88	2.30	8.6			[illegible]	9.13
			243.2	19.98	2.30	8.7	174.0	0.27	[illegible]	[illegible]
			243.4	19.66	2.30	8.5			[illegible]	[illegible]
			243.6	19.48	2.29	8.5			0.83	[illegible]
			243.8	19.29	2.26	8.5			0.77	9.25
			243.9	19.17	2.27	8.5			0.82	9.27
0430	36 10.8	121 58.1	244.1	19.24	2.27	8.5	234.0	0.25	0.71	9.31
			244.2	18.94	2.24	8.5			[illegible]	[illegible]
			244.4	18.64	2.25	8.3			0.91	[illegible]
			244.5	18.44	2.22	8.3			1.05	9.45
			244.7	18.25	2.21	8.3			1.24	9.70
			244.9	17.95	2.19	8.2	150.0	0.11	1.26	[illegible]
			245.0	16.41	2.09	7.9			1.23	10.25
			245.2	15.37	2.02	7.6			1.02	10.17
			245.4	13.59	1.91	7.1			1.12	[illegible]
			245.5	14.08	1.93	7.3			1.14	[illegible]
			245.6	14.28	1.93	7.4	223.0	0.29	1.25	10.55
			245.8	13.74	1.90	7.2			1.24	[illegible]
			245.9	12.94	1.85	7.0			1.43	[illegible]
			246.1	12.55	1.82	6.9			1.32	[illegible]
			246.2	12.25	1.80	6.8			1.36	10.30
0500	36 8.8	121 59.4	245.5	12.00	1.78	6.7	334.0	0.33	1.35	[illegible]
			246.7	11.66	1.73	6.7			1.34	11.05
			247.0	11.31	1.72	6.6			1.33	11.07
			247.3	11.16	1.69	6.6			1.32	[illegible]
			247.5	11.16	1.71	6.5			1.40	[illegible]
			247.8	11.06	1.70	6.5	404.0	0.26	1.44	11.11
			248.0	11.01	1.72	6.4			1.61	11.12
			248.3	10.31	1.68	6.4			1.73	11.13
			248.5	10.52	1.65	6.4			1.91	11.15
			248.8	10.27	1.65	6.2			1.94	11.14
			249.0	9.87	1.67	5.9	568.0	0.32	2.01	11.14
			249.3	9.57	1.61	5.9			1.96	11.17
			249.5	9.33	1.59	5.9			1.96	[illegible]
			249.8	9.23	1.58	5.8			1.85	[illegible]
			250.0	9.03	1.56	5.8			1.84	11.17

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
0530	36 7.1	122 0.9	250.3	9.03	1.56	5.8	408.0	0.35	1.52	11.16
			250.5	9.08	1.54	5.9			1.81	11.17
			250.8	9.08	1.55	5.9			1.59	11.19
			251.0	9.08	1.60	5.7			0.83	11.20
			251.2	9.03	1.57	5.8			0.74	11.10
			251.5	8.98	1.56	5.8	537.0	0.22	0.74	11.11
			251.7	8.93	1.60	5.6			0.73	11.05
			252.0	9.72	1.65	5.9			0.73	11.05
			252.2	10.52	1.71	6.2			0.76	11.13
			252.4	11.11	1.72	6.5			0.72	11.31
			252.7	10.85	1.71	6.4	212.0	0.26	0.77	11.43
			252.9	10.70	1.65	6.5			0.67	11.51
			253.2	9.72	1.64	5.9			0.67	11.54
			253.4	9.03	1.59	5.7			0.67	11.60
			253.6						0.67	11.66
0600	36 5.6	122 2.4	253.9	8.68	1.56	5.6	217.0	0.23	0.66	11.57
			254.2	8.44	1.57	5.4			0.66	11.49
			254.5	8.09	1.53	5.3			0.58	11.71
			254.8	8.14	1.56	5.2			0.58	11.45
			255.1	7.89	1.53	5.2			0.65	11.75
			255.4	7.49	1.51	5.0			0.65	11.76
			255.7	7.79	1.52	5.1			0.61	12.12
			256.0	7.74	1.51	5.1			0.71	12.25
			256.3	7.00	1.43	4.9			0.57	12.30
			256.6	6.40	1.41	4.5			0.53	12.37
			256.8	6.01	1.41	4.3			0.52	12.40
			257.1	5.56	1.36	4.1			0.52	12.41
			257.4	5.51					0.52	12.38
			257.7	5.46	1.35	4.0			0.52	12.42
			258.0	5.36	1.34	4.0			0.52	12.45
0630	36 3.7	122 4.2	258.2	4.97	1.33	3.7			0.48	12.43
			258.3	4.52	1.29	3.5			0.44	12.57
			258.5	3.83	1.25	3.1			0.47	12.55
			258.6	3.98	1.29	3.0			0.47	12.75
			258.8	3.56	1.23	2.9			0.43	12.88
			259.0	3.08	1.19	2.6	160.0	0.11	0.39	12.94
			259.1	2.69	1.19	2.3			0.39	12.96
			259.3	2.54	1.17	2.2			0.39	12.98
			259.4	2.49	1.16	2.1			0.39	13.10
			259.6	2.44	1.16	2.1			0.39	13.19
			259.8	2.29	1.16	2.0	134.0	0.16	0.39	13.23
			259.9	2.04	1.13	1.8			0.38	13.25
			260.1	1.85	1.14	1.6			0.42	13.24
			260.2	1.75	1.11	1.6			0.42	13.31
			260.4	1.65					0.42	13.32
0700	36 2.6	122 5.1	260.5	1.70	1.12	1.5	87.0	0.09	0.41	13.32
			260.7	1.70	1.10	1.5			0.41	13.35
			260.8	1.65	1.10	1.5			0.41	13.33
			260.9	1.55	1.09	1.4			0.41	13.42
			261.1	1.40	1.09	1.3			0.41	13.44

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
			261.2	1.25	1.08	1.2	76.0	0.01	0.41	13.47
			261.3	1.15	1.08	1.1			0.41	13.54
			261.4	0.95	1.07	0.9			0.37	13.57
			261.6	0.90	1.05	0.9			0.40	13.53
			261.7	0.90	1.04	0.9			0.40	13.54
			261.8	0.90	1.04	0.9	115.0	0.01	0.40	13.56
			262.0	0.90	1.04	0.9			0.40	13.54
			262.1	0.90	1.03	0.9			0.43	13.56
			262.2	0.90	1.02	0.9			0.40	13.54
			262.4	0.90	1.00	0.9			0.43	13.53
0730	36 1.8	122 5.8	262.5	0.85	0.99	0.9	147.0	0.21	0.43	13.52
			262.6	0.85	0.99	0.9			0.42	13.51
			262.7	0.85	0.99	0.9			0.42	13.50
			262.8						0.42	13.53
			262.9						0.47	13.50
			263.1						0.42	13.48
			263.2						0.39	13.47
			263.3						0.39	13.45
			263.4						0.38	13.44
			263.5						0.36	13.43
			263.6				146.0	0.22	0.38	13.42
			263.8						0.39	13.44
			263.9						0.38	13.42
			264.0						0.38	13.42
			264.1						0.38	13.41
0800	36 2.5	122 5.0	264.2				128.0	0.09	0.39	13.41
			264.4	0.52	1.02	0.5			0.38	13.41
			264.5	0.57	1.01	0.6			0.38	13.40
			264.6	0.67	1.01	0.7			0.38	13.37
			264.8	0.77	1.01	0.8			0.34	13.37
			264.9	0.87	0.98	0.9			0.34	13.37
			265.0	0.92	0.98	0.9			0.34	13.37
			265.1	1.02	0.99	1.0			0.38	13.35
			265.3	1.07	0.99	1.1			0.34	13.32
			265.4	1.17	0.98	1.2			0.38	13.30
			265.5	1.22	1.05	1.2			0.33	13.27
			265.7	1.31	1.03	1.3			0.36	13.27
			265.8	1.76	1.02	1.7			0.38	13.26
			265.9	1.41	1.02	1.4			0.39	13.25
			266.1	1.46	1.01	1.4			0.34	13.23
0830	36 3.3	122 4.2	266.2	1.45	1.01	1.4			0.34	13.17
			266.3	1.61	1.07	1.5			0.34	13.17
			266.4	1.55	1.01	1.5			0.34	13.14
			266.6	1.65	1.00	1.7			0.34	13.13
			266.7	1.66	1.00	1.7			0.34	13.06
			266.8	1.61	1.01	1.6	122.0	0.11	0.34	13.04
			267.0	1.71	1.03	1.7			0.34	13.00
			267.1	1.86	1.04	1.8			0.34	12.97
			267.2	1.86	1.04	1.8			0.34	12.85
			267.4	1.86	1.06	1.8			0.34	12.80

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
			267.5	2.25	1.09	2.1	113.0	0.04	0.34	12.72
			267.6	2.35	1.09	2.2			0.34	12.65
			267.7	2.45	1.10	2.2			0.34	12.63
			267.9	2.65	1.12	2.4			0.34	12.61
			268.0	2.79	1.12	2.5			0.34	12.60
0900	36 4.2	122 3.6	268.1	2.84	1.12	2.5	130.0	0.05	0.38	12.59
			268.2	2.84	1.13	2.5			0.38	[illegible]
			268.3	2.79	1.13	2.5			0.38	12.57
			269.4	2.79	1.11	2.5			0.39	12.57
			268.6	2.79	1.12	2.5			0.39	12.57
			268.7	2.79	1.12	2.5	131.0	0.11	0.40	12.58
			268.8	2.79	1.12	2.5			0.40	12.55
			268.9	2.79	1.11	2.5			0.40	12.53
			269.0	2.79	1.12	2.5			0.41	12.53
			269.1	2.94	1.11	2.6			0.41	12.50
			269.2	2.99	1.14	2.6	176.0	0.13	0.42	12.47
			269.3	2.94	1.14	2.6			0.42	12.44
			269.4	2.99	1.13	2.6			0.42	12.40
			269.6	3.29	1.13	2.9			0.43	12.38
			269.7	3.53	1.17	3.0			0.43	12.36
0930	36 5.0	122 3.1	269.8	3.53	1.16	3.0	104.0	0.14	0.44	12.34
			269.9	3.58	1.13	3.0			0.44	12.32
			270.0	3.68					0.44	12.27
			270.1	3.73	1.17	3.2			0.45	12.25
			270.2	3.78	1.19	3.2			0.45	[illegible]
			270.3	3.88	1.20	3.2	138.0	0.22	0.45	12.16
			270.4	4.17	1.20	3.5			0.46	12.14
			270.5	4.17	1.22	3.4			0.46	12.11
			270.6	4.47	1.22	3.7			0.47	12.10
			270.7	4.52	1.22	3.7			0.47	12.07
			270.8	4.67	1.24	3.8	122.0	0.06	0.47	12.05
			270.9	4.82	1.25	3.9			0.48	12.02
			271.0	5.06	1.25	4.0			0.49	12.00
			271.1	5.16	1.26	4.1			0.49	12.03
			271.2	5.36	1.28	4.2			0.53	11.96
1000	36 5.8	122 2.7	271.3	5.36	1.29	4.2	153.0	0.13	0.53	[illegible]
			271.4	5.46	1.29	4.2			0.53	11.74
			271.6	5.60	1.30	4.3			0.52	11.42
			271.7	5.70	1.28	4.5			0.52	11.39
			271.8	5.75	1.31	4.4			0.51	11.38
			271.9	5.90	1.31	4.5	170.0	0.18	0.51	11.37
			272.0	5.95	1.31	4.5			0.50	11.37
			272.1	6.10	1.33	4.6			0.50	11.37
			272.2	6.15	1.31	4.7			0.49	11.31
			272.3						0.49	11.30
			272.4				159.0	0.18	0.49	11.30
			272.5	6.25	1.32	4.7			0.48	11.30
			272.6	6.39	1.34	4.8			0.47	11.80
			272.7	6.49	1.33	4.9			0.47	11.77
			272.8	6.69	1.36	4.9			0.46	11.75

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
1030	36 6.8	122 2.4	272.9	6.84	1.36	5.0	189.0	0.33	0.46	11.59
			273.0	7.03	1.36	5.2			0.45	11.65
			273.1	7.33	1.40	5.2			0.46	11.55
			273.3	7.53	1.39	5.4			0.47	11.53
			273.4	7.58	1.40	5.4			0.47	11.41
			273.5	7.97	1.42	5.6			0.46	11.35
			273.6	8.66	1.45	6.0			0.46	11.32
			273.7	8.76	1.46	6.0			0.45	11.37
			273.8	8.95	1.47	6.1			0.48	11.39
			273.9	8.81	1.46	6.0			0.50	11.35
			274.0	8.86	1.45	6.1	118.0	0.30	0.47	11.34
			274.1	8.96	1.47	6.1			0.49	11.30
			274.3	9.06	1.47	6.2			0.52	11.22
			274.4	9.15	1.48	6.2			0.51	11.25
			274.5	9.35	1.48	6.3			0.50	11.25
			274.6	9.40	1.49	6.3			0.50	11.15
1102	36 7.7	122 1.9	274.8						0.59	11.13
			275.1	9.75	1.53	6.4			0.71	11.07
			275.4	9.80	1.52	6.4			0.81	11.00
			275.6	9.99	1.54	6.5			0.95	10.84
			275.9	10.34	1.55	6.7	164.0	0.25	1.05	10.73
			276.2	10.73	1.57	6.8			1.09	10.52
			276.4	11.13	1.59	7.0			1.19	10.73
			276.7	11.67	1.64	7.1			1.25	10.77
			277.0	11.22	1.60	7.0			1.53	10.92
			277.2	10.64	1.56	6.8			2.18	10.93
			277.5	9.99	1.52	6.6			2.68	10.99
			277.8	9.75	1.50	6.5			2.83	11.02
			278.0	9.65	1.50	6.4			3.19	11.03
			278.3	9.55	1.50	6.4			3.30	11.05
1130	36 8.8	122 1.9	278.5	9.55	1.49	6.4	331.0	0.37	3.63	11.00
			278.6	9.50	1.49	6.4			3.80	11.07
			278.8	9.55	1.49	6.4			4.01	11.05
			278.9	9.55	1.51	6.3			4.04	11.16
			279.1	9.55	1.52	6.3			4.20	11.06
			279.3	9.60	1.49	6.4			4.25	11.05
			279.4	9.65	1.49	6.5			4.51	11.04
			279.6	9.60	1.48	6.5			4.67	11.02
			279.7	9.80	1.50	6.5			4.83	11.00
			279.9	9.94	1.49	6.7			4.99	11.00
			280.1	10.04	1.50	6.7	277.0	0.34	5.14	11.00
			280.2	10.04	1.49	6.7			5.43	10.77
			280.4	10.04	1.50	6.7			5.74	10.77
			280.5	9.99	1.49	6.7			5.89	10.96
			280.7	9.94	1.52	6.5			5.32	10.94
1200	36 10.1	122 2.1	280.9	10.29	1.53	6.7			5.32	10.83
			281.1						5.39	10.82
			281.2						5.45	10.83
			281.4	10.34					5.33	10.85
			281.6	10.34	1.52	6.8			5.21	10.78

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR. RATIO NO3/PO4	ATP NG/L	$\frac{\Delta ATP}{ATP}$	CHL A MG/M3	TEMP DEG C
			281.8	10.44	1.54	6.8	236.0	0.36	5.59	10.55
			282.0	10.14	1.53	6.6			4.82	10.59
			282.1	10.37	1.53	6.8			4.08	10.23
			282.3	11.37	1.62	7.0			3.[illegible]	10.13
			282.5	11.77	1.64	7.2			3.13	10.05
			282.7	12.41	1.67	7.4			2.81	10.00
			282.9	13.25	1.74	7.6			2.40	9.96
			283.0	13.64	1.76	7.8			2.24	9.94
			283.2	13.84	1.80	7.7			2.14	9.85
1228	36 11.4	122 2.4	283.4	14.13	1.80	7.9			2.08	9.84
			283.6	14.14	1.79	7.9	123.0	0.38	1.[illegible]	9.80
			283.7	14.38	1.82	7.9			1.83	9.77
			283.9	14.73	1.81	8.1			1.78	9.76
			284.1	14.73	1.82	8.1			1.72	9.75
			284.3	14.88	1.84	8.1			1.55	9.64
			284.5	15.02	1.85	8.1			1.39	9.62
			284.6	15.02	1.85	8.1			1.34	9.55
			284.8	15.37	1.89	8.1			1.29	9.53
			285.0	15.36	1.90	8.3			1.24	9.50
			285.2	16.06	1.93	8.3			1.19	9.49
			285.4	16.21	1.94	8.4	130.0	0.17	1.14	9.47
			285.5	16.41	1.94	8.5			1.05	9.44
			285.7	16.50	1.97	8.4			1.04	9.43
			285.9	16.55	1.94	8.5			0.99	9.40
			286.1	16.70	1.96	8.5			0.95	9.28
1300	36 12.9	122 2.6	286.3	16.45	1.97	8.4			0.95	9.23
			286.5						0.95	9.20
			286.7						1.03	9.20
			286.9						1.04	9.20
			287.1						1.04	9.10
			287.3				193.0	0.32	1.05	9.20
			287.5	18.03	2.09	8.6			1.13	9.21
			287.7	17.98	2.08	8.6			1.14	9.22
			287.9	17.98	2.07	8.7			1.14	9.21
			288.1	17.98	2.07	8.7			1.15	9.21
			288.3	17.64	2.07	8.6			1.23	9.20
			288.5	17.89	2.07	8.6			1.16	9.20
			288.7	17.84	2.07	8.6			1.24	9.18
			288.9	17.79	2.06	8.6			1.25	9.10
			289.1	17.93	2.07	8.7			1.25	9.[illegible]
1330	36 14.5	122 2.6	289.3	17.93	2.06	8.7	145.0	0.15	1.26	9.25
			289.5	17.93	2.06	8.7			1.27	9.24
			289.7	17.93	2.07	8.7			1.27	9.23
			289.9	17.49	2.06	8.5			1.28	9.22
			290.1	17.34	2.04	8.5			1.36	9.20
			290.3	17.49	2.04	8.6			1.37	9.20
			290.5	17.49	2.08	8.4			1.35	9.23
			290.7	17.59	2.04	8.6			1.36	9.24
			290.9	17.79	2.07	8.6			1.31	9.31
			291.1	17.69	2.07	8.5			1.31	9.35

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
			291.3	17.54	2.07	8.5	76.0	0.29	1.40	9.33
			291.5	17.00	2.05	8.5			1.49	9.37
			291.7	16.65	1.99	8.4			1.50	9.33
			291.9	16.50	2.00	8.3			1.59	9.44
			292.1	16.50	2.00	8.3			1.51	9.50
1400	36 16.1	122 2.6	292.3	15.40	1.96	8.3			1.59	9.52
			292.5	15.02	1.95	8.0			1.64	9.73
			292.7	14.93	1.97	7.9			1.57	9.82
			292.9	14.83	1.88	7.9			1.65	9.96
			293.0	13.74	1.83	7.6			1.74	10.04
			293.2	13.40	1.79	7.5	190.0	0.25	1.71	10.12
			293.4	12.95	1.72	7.5			1.72	10.25
			293.6	12.16	1.69	7.2			1.71	10.23
			293.8	11.57	1.66	7.0			1.79	10.30
			294.0	11.18	1.63	6.9			1.76	10.39
			294.2	10.93	1.59	6.9			1.81	10.47
			294.4	10.73	1.53	6.7			1.83	10.52
			294.6	10.49	1.57	6.7			2.05	10.47
			294.8	10.34	1.55	6.7			2.19	10.53
			295.0	10.19	1.54	6.6			2.24	10.51
1430	36 17.7	122 2.6	295.1	10.14	1.52	6.7	448.0	0.35	2.25	10.50
			295.3	10.14	1.52	6.7			2.24	11.00
			295.5	10.29	1.53	6.7			2.30	11.19
			295.7	9.90	1.49	6.6			2.52	11.24
			295.9	7.48	1.36	5.5			2.76	11.14
			296.1	6.99	1.33	5.3			2.34	11.15
			296.3	6.79	1.31	5.2			[illegible]	11.14
			296.5	7.03					1.79	[illegible]
			296.7						1.73	11.23
			296.9						1.65	[illegible]
			297.1				263.0	0.35	1.77	11.22
			297.3						1.57	11.27
			297.4						1.59	11.26
			297.6						2.01	[illegible]
			297.8	7.09	1.40	5.1			2.04	11.30
1500	36 19.2	122 2.7	298.3	7.18	1.36	5.3			2.03	11.34
			298.7	7.33	1.36	5.4			2.01	[illegible]
			299.1	7.03	1.33	5.3			1.93	11.27
			299.6	7.13	1.32	5.4			1.82	11.35
			300.0	7.08	1.34	5.3			1.94	11.33
			300.4	7.13	1.33	5.4	215.0	0.39	1.90	11.35
			300.9	6.89	1.34	5.1			1.89	11.42
			301.3	6.64	1.31	5.1			1.88	11.47
			301.7	6.64	1.34	5.0			1.93	[illegible]
			302.1	6.59	1.31	5.0			1.99	11.52
			302.6	6.29	1.28	4.9	468.0	0.39	1.84	11.55
			303.0	5.90	1.26	4.7			1.83	11.52
			303.4	5.75	1.26	4.6			1.69	[illegible]
			303.9	5.41	1.24	4.4			1.74	11.61
			304.3	5.26	1.21	4.3			2.00	11.66

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUTR.RATIO NO3/PO4	ATP NG/L	$\frac{\Delta ATP}{ATP}$	CHL A MG/M3	TEMP DEG C
1530	36 22.7	122 4.5	304.8	5.06	1.19	4.3	449.0	0.33	[illegible]	11.73
			305.4	4.86	1.54	3.2			2.04	11.71
			305.9	4.47	1.13	4.0			2.49	11.73
			306.4	3.43	1.09	3.5			2.47	11.75
			306.9	3.73	1.08	3.5			2.39	11.73
			307.5	3.53	1.08	3.3	482.0	0.47	2.51	11.80
			308.0	3.24	1.07	3.0			2.62	11.59
			308.5	3.19	1.07	3.0			2.60	11.62
			309.0	3.09					2.71	11.60
			309.6	4.42	1.13	3.9			2.75	11.57
			310.1	5.65	1.23	4.6	332.0	0.37	2.66	11.50
			310.6	6.25	1.29	4.8			2.60	11.50
			311.1	6.49	1.33	4.9			1.35	11.57
			311.7	6.59	1.33	5.0			1.10	11.40
			312.2	6.74	1.33	5.1			0.91	11.42
1600	36 25.8	122 4.4	312.7	6.64	1.33	5.0	180.0	0.23	0.90	11.43
			313.1	6.49	1.33	4.9			0.78	11.53
			313.6	6.74	1.33	5.1			0.78	11.57
			314.1	6.59	1.32	5.0			0.74	11.64
			314.6	6.54	1.32	5.0			0.84	11.71
			315.0	6.25	1.32	4.7	227.0	0.32	0.84	11.75
			315.5	6.00	1.27	4.7			0.85	11.80
			316.0	5.90	1.30	4.5			0.85	11.90
			316.5	5.95	1.29	4.6			0.91	11.75
			316.9	5.95	1.28	4.6			0.91	11.60
			317.4	5.90	1.29	4.6	135.0	0.48	0.91	11.60
			317.9	5.95	1.29	4.6			0.85	11.57
			318.4	6.29	1.31	4.8			0.77	11.52
			318.8	6.49	1.40	4.6			0.80	11.50
			319.3	6.59	1.30	5.1			0.74	11.43
1630	36 30.7	122 4.8	319.8	6.74	1.33	5.1	82.0	0.29	0.74	11.40
			320.3	6.94	1.37	5.1			0.74	11.42
			320.7	7.03	1.36	5.2			0.74	11.57
			321.2	7.23	1.39	5.2			0.74	11.70
			321.7	6.74	1.32	5.1			0.74	11.63
			322.2	6.69	1.32	5.1	177.0	0.38	0.75	11.63
			322.6	5.95	1.27	4.7			0.75	11.62
			323.1	5.80	1.26	4.6			0.75	11.55
			323.5	6.00	1.27	4.7			0.75	11.65
			324.1	5.90	1.23	4.6			0.71	11.64
			324.5	6.05	1.31	4.6	435.0	0.32	1.07	11.51
			325.0	5.60	1.26	4.4			1.22	11.65
			325.5	5.11	1.21	4.2			1.33	11.50
			326.0	4.03					1.33	11.35
			326.4	4.57					1.27	11.37
1700	36 34.5	122 5.4	326.9	5.41	1.27	4.3	555.0	0.46	1.46	11.20
			327.4	5.80	1.27	4.6			1.59	11.33
			327.9	6.44					1.72	11.32
			328.3	6.00	1.31	4.6			2.11	11.79
			328.8		1.32				1.92	11.85

R/V ACANIA 11 JUNE 1980 CHEMICAL MESOSCALE (CRUISE XII)

TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DISTANCE KM	NO3 UM	PO4 UM	NUIR.RATIO NO3/PO4	ATP NG/L	ΔATP/ATP	CHL A MG/M3	TEMP DEG C
			329.3		1.33		231.0	0.46	1.67	11.36
			329.8		1.29				1.48	11.77
			330.2	3.58					1.68	11.57
			330.7						1.62	12.00
			331.2		1.11				1.49	12.03
			331.7	4.12			509.0	0.43	1.49	12.03
			332.1	4.27					1.72	12.07
			332.6	4.42					1.76	12.13
			333.1						1.73	12.23
			333.6	4.86					1.70	12.15
1730	36 37.8	122 0.9	334.2	2.39			582.0	0.50	1.77	12.24
			334.8		1.02				1.64	12.12
			335.4	2.00	1.02	2.0			1.81	12.22
			336.0		0.99				1.85	12.25
			336.6						1.72	12.35
			337.2				573.0	0.55	1.65	12.45
			337.8						1.52	12.45
			338.4						1.19	12.55
			339.0						1.26	12.60
			339.6						1.47	12.50
			340.2				718.0	0.38	1.40	12.30
			340.8						1.40	12.70
			341.4						1.47	12.50
			342.0						1.54	12.50
			342.6						1.54	12.70
1800	36 34.4	121 55.4	342.6				640.0	0.56	1.55	12.90

651.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916...
651.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916.....END JOB HAN51916...

APPENDIX B

Listing of Nansen Cast Data: Station, Time, Latitude Longitude, Depth, Salinity, Temperature, Density, Nitrate, ATP

R/V ACANIA 29-30 NOVEMBER 1979 CHEMICAL MESOSCALE (CRUISE X)

STATION #	TIME GMT	LATITUDE NORTH	LONGITUDE WEST	DEPTH M	SALINITY PPT	TEMPERATURE DEG C	DENSITY SIGMA T	NO3 UM	ATP NG/L
1	2002	36 15.8	122 4.8	2.5	33.423	14.30	26.47	1.44	79.0
				25.0	33.423	12.31	26.35	9.80	41.0
				50.0	32.388	10.20	25.49	18.21	
				100.0	33.746	9.43	26.54	21.54	
				200.0	34.034	8.14	26.78	27.03	
				300.0	34.091	7.73	26.84	30.06	
				400.0	34.158	7.46	26.90	32.05	
2	2134	36 11.4	121 59.7	2.5	33.470	14.80	26.54	0.76	57.0
				25.0	33.470	13.17	26.43	7.14	156.0
				50.0	33.478	10.99	26.35	14.88	
				100.0	33.731	9.80	26.53	20.25	
				175.0	33.987	8.28	26.74	25.19	
				292.0	34.097	7.51	26.85	30.81	
				395.0	34.164	7.00	26.92	33.33	
3	2241	36 12.1	122 3.0	2.5	33.483	13.00	26.43	6.61	112.0
				25.0	33.493	12.69	26.41	8.14	165.0
				50.0	33.483	10.85	26.35	15.24	
				100.0	33.827	9.34	26.60	21.86	
				180.0	34.009	8.30	26.76	25.87	
				280.0	34.021	7.47	26.79	25.79	
				360.0	34.111	7.12	26.88	32.65	
4	2343	36 12.0	122 8.0	2.5	33.489	13.65	26.47	3.44	65.0
				25.0	33.489	12.73	26.42	8.34	86.0
				50.0	33.523	11.99	26.41	11.79	31.0
				100.0	33.614	9.62	26.44	19.77	
				200.0	33.969	7.26	26.76	24.91	
				300.0	34.076	6.86	26.86	30.60	
				400.0	34.272	6.54	27.03	34.78	
5	0044	36 16.2	122 9.9	2.5	33.547	12.90	26.48	5.33	99.0
				25.0	33.547	12.58	26.46	8.02	162.0
				50.0	33.587	10.64	26.42	16.21	14.0
				100.0	33.751	9.28	26.54	21.37	
				180.0	34.007	8.37	26.76	26.04	
				295.0	34.121	7.28	26.89	30.58	
				400.0	34.227	6.81	26.98	34.76	
6	0136	36 19.1	122 12.9	2.5	33.425	13.20	26.40	3.68	157.0
				25.0	33.425	13.22	26.40	5.68	25.0
				50.0	33.552	12.21	26.45	11.25	98.0
				100.0	33.676	9.74	26.48	20.04	
				172.0	34.202	7.85	26.92	28.47	
				296.0	34.050	7.42	26.82	33.33	
				400.0	34.296	6.93	27.03	35.85	
7	0300	36 22.0	122 3.8	2.5	33.509	12.70	26.44	7.05	85.0
				25.0	33.509	12.51	26.43	9.52	108.0
				50.0	33.500	11.63	26.38	13.91	35.0
				100.0	33.509	10.34	26.36	19.39	
				185.0	34.009	7.98	26.77	30.28	
				300.0	34.116	7.44	26.87	33.24	
				400.0	34.132	6.90	26.90	35.23	

APPENDIX C

Computer Programs

```
FORTRAN IV G LEVEL  21                MAIN              DATE = 80183         12/56/37            PAGE 0001

                 C
                 C      TABULAR DATA COMPILER
                 C
 0001                   REAL MLAT,MLON,NO3,PO4,SST,ATP,CHLA,SPD,SUM,DIST,RNOPO,
                       1MLATA,MLONA,NO3A,PO4A,SSTA,ATPA,CHLAA,SPDA
 0002                   INTEGER DLAT,DLON,TIND,TIME,FINI,START,LINE,
                       1DLATA,DLONA,TINDA,TIMEA
 0003                   DIMENSION DLAT(2000),MLAT(2000),DLON(2000),MLON(2000),TIND(2000),
                       1NO3(2000),PO4(2000),SST(2000),ATP(2000),CHLA(2000),TIME(2000),
                       2SPD(2000),DLATA(1000),MLATA(1000),DLONA(1000),MLONA(1000),
                       3TINDA(1000),NO3A(1000),PO4A(1000),SSTA(1000),ATPA(1000),
                       4CHLAA(1000),TIMEA(1000),SPDA(1000)
 0004                   DATA DLAT,MLAT,DLON,MLON,TIND,NO3,PO4,SST,ATP,CHLA,TIME/2000*0,
                       12000*0.,2000*0,2000*0.,2000*0,2000*0.,2000*0.,2000*0.,2000*0.,
                       22000*0.,2000*0/
 0005                   DATA SPD/2000*0./
                 C
                 C
 0006                   DO 10 I=1,1000
 0007                   READ (5,100) TIMEA(I),DLATA(I),MLATA(I),DLONA(I),MLONA(I),
                       1TINDA(I),SPDA(I)
 0008                   TINDA(I) = TIMEA(I) + 2
 0009                   START=I
 0010                   IF(TIMEA(I).EQ.9999) GO TO 20
 0011             10    CONTINUE
 0012             20    FINI=START+1000
 0013                   DO 30 I=START,FINI
 0014                   READ (5,200) NO3A(I),PO4A(I),SSTA(I),TINDA(I),ATPA(I),CHLAA(I)
 0015                   TINDA(I) = TINDA(I) + 2
 0016                   J=I-1
 0017                   IF (NO3A(I).EQ.99.99) GO TO 40
 0018             30    CONTINUE
 0019             40    FINI=J
 0020                   LINE=TINDA(J)
 0021                   DO 50 K=START,FINI
 0022                   L=TINDA(J)
 0023                   TIND(L)=TINDA(J)
 0024                   NO3(L)=NO3A(J)
 0025                   PO4(L)=PO4A(J)
 0026                   SST(L)=SSTA(J)
 0027                   ATP(L)=ATPA(J)
 0028                   CHLA(L)=CHLAA(J)
 0029                   J=J-1
 0030             50    CONTINUE
 0031                   START=START-1
 0032                   J=START
 0033                   DO 60 K=1,START
 0034                   L=TINDA(J)
 0035                   DLAT(L)=DLATA(J)
 0036                   MLAT(L)=MLATA(J)
 0037                   DLON(L)=DLONA(J)
 0038                   MLON(L)=MLONA(J)
 0039                   TIME(L)=TIMEA(J)
 0040                   SPD(L)=SPDA(J)
 0041                   J=J-1
 0042             60    CONTINUE
 0043                   DIST=.617333
 0044                   SUM=0.
 0045                   I=2
 0046                   DO 95 L=1,20
 0047             70    WRITE (6,300)
 0048                   DO 80 K=1,50
 0049                   IF (DLAT(I) .GT. 0) GO TO 86
 0050             71    SUM=SUM+DIST
 0051                   WRITE (6,400) SUM
 0052             72    IF (SST(I) .GT. 0.) WRITE (6,1300) SST(I)
 0053             73    IF(NO3(I).EQ.0.) WRITE (6,500)
 0054             74    IF(NO3(I).GT.0.) WRITE (6,600) NO3(I)
 0055             75    IF(PO4(I).EQ.0.) WRITE (6,700)
 0056             76    IF(PO4(I).GT.0.) WRITE (6,800) PO4(I)
 0057             77    RNOPO=0.
 0058             78    IF(NO3(I).GT.0..AND.PO4(I).GT.0.) RNOPO=NO3(I)/PO4(I)
 0059             79    IF(RNOPO.GT.0.) WRITE (6,900) RNOPO
```

FORTRAN IV G LEVEL 21 MAIN DATE = 80181 12/56/37 PAGE 0002

```
0060         81 IF(ATP(I).GT.0.) WRITE (6,1000) ATP(I)
0061         82 IF(CHLA(I).GT.0.) WRITE (6,1100) CHLA(I)
0062         83 WRITE (7,1400) TIME(I),DLAT(I),MLAT(I),DLON(I),MLON(I),TIND(I),
               1SUP,NO3(I),PO4(I),RATIO,ATP(I),CHLA(I),SST(I)
0063            I=I+2
0064         84 IF(I.GT.LINE) GO TO 90
0065         85 GO TO 80
0066         86 DIST=SPD(I)*.0617333
0067            SUM=SUM+DIST
0068            WRITE (6,2000) TIME(I),DLAT(I),MLAT(I),DLON(I),MLON(I),SUM
0069            GO TO 72
0070         80 CONTINUE
0071         55 CONTINUE
0072        100 FORMAT (I4,6X,I2,F5.1,3X,I3,F5.1,11X,I4,3X,F4.1)
0073        200 FORMAT (2X,F5.2,5X,F5.2,5X,F5.2,3X,I4,9X,F7.2,F7.2)
0074        300 FORMAT (1H1///////////32X,'R/V ACANIA',T48,'                 ',170,
               1'CHEMICAL MESOSCALE (CRUISE    )' /// 18X,'TIME',4X,'LATITUDE',2X,
               2'LONGITUDE',2X,'DISTANCE',4X,'NO3',6X,'PO4',5X,'NUTR.RATIO',5X,
               3'ATP',6X,'CHL A',4X,'TEMP'/ 18X,'GMT',6X,'NORTH',6X,'WEST',3X,
               4'NM',7X,'UM',7X,'UM',7X,'NO3/PO4',7X,'NG/L',5X,'MG/M3',4X,'DEG C')
0075        400 FORMAT (T45,F5.1)
0076        500 FORMAT ('+',T55,'--.--')
0077        600 FORMAT ('+',T55,F5.2)
0078        700 FORMAT ('+',T66, '--.--')
0079        800 FORMAT ('+',T66, F5.2)
0080        900 FORMAT ('+',T79, F4.1)
0081       1000 FORMAT ('+',T91,F6.1)
0082       1100 FORMAT ('+',T101,F5.2)
0083       1200 FORMAT (T15,I4,T27,I2,F5.1,3X,I3,F5.1,4X,F5.1)
0084       1300 FORMAT ('+',T110,F5.2)
0085       1400 FORMAT (I4,2(I4,F5.1,1X),1X,I4,2X,F5.1,2(2X,F5.2),2X,F4.1,2X,
               1F6.1,2(2X,F5.2))
0086       2000 FORMAT (2(I4,3X),2(F5.2,3X))
0087         90 STOP
0088            END
```

```
FORTRAN IV G LEVEL  21                MAIN                DATE = 80211          15/38/35              PAGE 0001

                  C
                  C       TABULAR DATA COMPILER RV-ATP
                  C
 0001                     REAL MLAT,MLON,NO3,PO4,SST,ATP,CHLA,SPD,SUM,DIST,HNCRC,
                         1MLATA,MLONA,NO3A,PO4A,SSTA,ATPA,CHLAA,SPDA,RATPA,RATP
 0002                     INTEGER DLAT,DLON,TIND,TIME,FINI,START,LINE,
                         1DLATA,DLONA,TINDA,TIMEA
 0003                     DIMENSION DLAT(2500),MLAT(2500),DLON(2500),MLON(2500),TIND(2500),
                         1NO3(2500),PO4(2500),SST(2500),ATP(2500),CHLA(2500),TIME(2500),
                         2SPD(2500),DLATA(1275),MLATA(1275),DLONA(1275),MLONA(1275),
                         3TIMEA(1275),NO3A(1275),PO4A(1275),SSTA(1275),ATPA(1275),
                         4CHLAA(1275),TIMEA(1275),SPDA(1275),RATP(2500),RATPA(1275)
 0004                     DATA DLAT,MLAT,DLON,MLON,TIND,NO3,PO4,SST,ATP,CHLA,TIME/2500*0,
                         12500*0.,2500*0,2500*0.,2500*0,2500*0.,2500*0.,2500*0.,2500*0.,
                         22500*0.,2500*0/
 0005                     DATA SPD,RATP/2500*0.,2500*0./
                  C
                  C
 0006                     DO 10 I=1,1250
 0007                     READ (5,100) TIMEA(I),DLATA(I),MLATA(I),DLONA(I),MLONA(I),
                         1TINDA(I),SPDA(I)
 0008                     TIMEA(I) = TIMEA(I)-50
 0009                     START=I
 0010                     IF(TIMEA(I).EQ.9999) GO TO 20
 0011                  10 CONTINUE
 0012                  20 FINI=START+1250
 0013                     DO 30 I=START,FINI
 0014                     READ (5,200) NO3A(I),PO4A(I),SSTA(I),TINDA(I),ATPA(I),CHLAA(I),
                         1RATPA(I)
 0015                     TINDA(I) = TINDA(I)-50
 0016                     J=I-1
 0017                     IF (NO3A(I).EQ.99.99) GO TO 40
 0018                  30 CONTINUE
 0019                  40 FINI=J
 0020                     LINE=TINDA(J)
 0021                     DO 50 K=START,FINI
 0022                     L=TINDA(J)
 0023                     TIND(L)=TINDA(J)
 0024                     NO3(L)=NO3A(J)
 0025                     PO4(L)=PO4A(J)
 0026                     SST(L)=SSTA(J)
 0027                     ATP(L)=ATPA(J)
 0028                     RATP(L)=RATPA(J)
 0029                     CHLA(L)=CHLAA(J)
 0030                     J=J-1
 0031                  50 CONTINUE
 0032                     START=START-1
 0033                     J=START
 0034                     DO 60 K=1,START
 0035                     L=TIMEA(J)
 0036                     DLAT(L)=DLATA(J)
 0037                     MLAT(L)=MLATA(J)
 0038                     DLON(L)=DLONA(J)
 0039                     MLON(L)=MLONA(J)
 0040                     TIME(L)=TIMEA(J)
 0041                     SPD(L)=SPDA(J)
 0042                     J=J-1
 0043                  60 CONTINUE
 0044                     DIST=.011333
 0045                     SUM=0.
 0046                     I=2
 0047                     DO 99 I=1,25
 0048                  70 WRITE (6,300)
 0049                     DO 90 K=1,50
 0050                     IF (DLAT(I) .GT. 0) GO TO 88
 0051                  71 SUM=SUM+DIST
 0052                     WRITE (6,400) SUM
 0053                  72 IF (SST(I) .GT. 0.) WRITE (6,1300) SST(I)
 0054                  73 IF(NO3(I).EQ.0.) WRITE (6,500)
 0055                  74 IF(NO3(I).GT.0.) WRITE (6,600) NO3(I)
 0056                  75 IF(PO4(I).EQ.0.) WRITE (6,700)
 0057                  76 IF(PO4(I).GT.0.) WRITE (6,800) PO4(I)
 0058                  77 HNCRC=0.
```

```
   76 IF(NO3(I).GT.0..AND.PO4(I).GT.0.) [illegible]
   77 IF(NO3(I).LT.0.) WRITE (6,500) NO3(I)
   81 IF(ATP(I).LT.0.) WRITE (6,1000) ATP(I)
   82 IF(CHLA(I).LT.0.) WRITE (6,1100) CHLA(I)
   87 IF(RATP(I) .LT. 0.) WRITE(6,1500) RATP(I)
   83 WRITE (7,1400) TIME(I),CLAT(I),MLAT(I),DLON(I),MLON(I),TINC(I),
     1SUM,NO3(I),PO4(I),RATIO,ATP(I),CHLA(I),SST(I)
      I=I+2
   84 IF(I.GT.LINE) GO TO 90
   85 GO TO 80
   86 DIST=SQRT(I1**2+C(I7))
      SUM=SUM+DIST
      WRITE (6,1200) TIME(I),CLAT(I),MLAT(I),DLON(I),MLON(I),SUM
      GO TO 72
   80 CONTINUE
   90 CONTINUE
  100 FORMAT (I4,2X,I2,F5.1,3X,I3,F5.1,11X,I4,9X,F4.1)
  200 FORMAT (2X,F5.2,5X,F5.2,5X,F5.2,2X,I4,10X,F7.2,F7.2,5X,F4.2)
  300 FORMAT (1H1,//////////32X,'F/V ACANIA',T66,'                    ',T70,
     1'CHEMICAL RESULTS ALL CRUISE    )' /// 13X,'TIME',4X,'LATITUDE',2X,
     2'LONGITUDE',2X,'DISTANCE',4X,'NO3',6X,'PO4',5X,'NLTR.RATIO',5X,
     3'ATP',11X,'CHL A',4X,'TEMP'/ 13X,'CMT',6X,'NORTH',6X,'WEST',8X,
     4'KM',7X,'UM',7X,'UM',7X,'NO3/PO4',7X,'NG/L',T105,'MG/M3',4X,
     5'DEG C')
  400 FORMAT (I44,F5.1)
  500 FORMAT ('+',I54,'-----')
  600 FORMAT ('+',I54,F5.2)
  700 FORMAT ('+',I63,'-----')
  800 FORMAT ('+',I63, F5.2)
  900 FORMAT ('+',I74, F4.1)
 1000 FORMAT ('+',I86,F6.1)
 1100 FORMAT ('+',I105,F5.2)
 1200 FORMAT (I14,I4,I22,I2,F5.1,3X,I3,F5.1,4X,F5.1)
 1300 FORMAT ('+',I114,F5.2)
 1400 FORMAT (I4,2I3,F5.1,1X,1X,I4,2X,F5.1,2(2X,F5.2),2X,F4.1,2X,
     1F6.1,2(2X,F5.2))
 1500 FORMAT ('+',I57,F4.2)
 2000 FORMAT (2(I4,3A1,2(F5.2,3X)))
   90 STOP
      END
```

```
C
C     TABULAR DATA FOR LENTH POISSON PROG
C
C
      REAL DEPTH,TEMP,NO3,PO4,ATP,CHLA,MLAT,MLON,SAL,ANCPO
      INTEGER STAT,DLAT,TIME,DLAT,DLON,LINE
      DIMENSION LINE(100),DEPTH(100,12),TEMP(100,12),NO3(100,12),
     1PO4(100,12),ATP(100,12),CHLA(100,12),TIME(100),DLAT(100),
     *DLON(100),MLAT(100),MLON(100),SAL(100,12),ANCPO(100,12)
      DIMENSION SIGMAT (100,12)
      STAT=1
      DO 20 I=1,100
      TIME(I)=0
      DLAT(I)=0
      MLAT(I)=0.
      DLON(I)=0
      MLON(I)=0.
      DO 10 J=1,12
      DEPTH(I,J)=0.
      SAL(I,J)=0.
      TEMP(I,J)=0.
      NO3(I,J)=0.
      PO4(I,J)=0.
      ANCPO(I,J)=0.
      ATP(I,J)=0.
      CHLA(I,J)=0.
   10 CONTINUE
   20 CONTINUE
C
      DO 30 I=1,7
      READ (5,100) TIME(I),DLAT(I),MLAT(I),DLON(I),MLON(I)
   30 CONTINUE
   35 DO 40 I=1,7
      READ (5,200) (DEPTH(I,J),J=1,7)
      READ (5,200) (SAL(I,J),J=1,7)
      READ (5,200) (TEMP(I,J),J=1,7)
      READ (5,200) (NO3(I,J),J=1,7)
      READ (5,200) (ATP(I,J),J=1,7)
   40 CONTINUE
      CALL SIGMA (7,7,SAL,TEMP,SIGMAT)
   60 WRITE (6,300)
      DO 75 K=1,7
      WRITE(6,400) K,TIME(K),DLAT(K),MLAT(K),DLON(K),MLON(K)
      DO 70 J=1,7
      WRITE (6,500) DEPTH(K,J),SAL(K,J),TEMP(K,J)
      IF (NO3(K,J) .GT. 0.) WRITE (6,600) NO3(K,J)
   67 IF (ATP(K,J) .GT. 0.) WRITE (6,800) ATP(K,J)
   70 CONTINUE
   75 CONTINUE
  100 FORMAT (I4,6X,I3,F5.1,3X,I3,F5.1)
  200 FORMAT (7F6.3)
  300 FORMAT(1H1,//////////30X,'S/V ACONTA',T48,
     1'ZP ..V / ..S ACV..77',' CHEMICAL ..S.. ..C.. (COLLISP X)'///
     22X,' DEPTH',5X,'SALINITY',5X,'TEMP',8X,'NO3',6X,'PO4',5X,
     3'NO2',6X,'NO3..',5X,'..',6X,'CHL A'/26X,'M',9X,'PPT',6X,'DEG C',7X,
     4'UA',5X,'UA',7X,'NO3/PO4',7X,'NO/L',5X,'MG/M3')
  400 FORMAT (2X,'STATION ',I3,4X,'TIME ',I4,' GMT',4X,'LATITUDE ',I2,
     1F5.1,' NORTH',4X,'LONGITUDE ',I3,F5.1,' WEST')
  500 FORMAT (T25,F5.1,T36,F6.3,T46,F5.2)
  600 FORMAT ('+',T55,F5.2)
  700 FORMAT ('+',T75,F5.2)
  800 FORMAT ('+',T93,F6.1)
  900 FORMAT ('+',T103,F5.2)
 1000 FORMAT ('+',T83,F5.2)
   90 STOP
      END
```

```
      SUBROUTINE SIGMA (M,N,SAL,TEMP,SIGMAT)
      DIMENSION SAL(100,12),TEMP(100,12),SIGMAT(100,12)
      WRITE (6,1300)
 1300 FORMAT (1H1///30X,'STA LVL   SALINITY    TEMPERATURE    SIGMA-T')
      DO 2 I=1,M
      DO 2 J=1,N
      CL=(SAL(I,J)-.03)/1.805
      SIGO=3.98E-5*CL*CL*CL-1.57E-3*CL*CL+1.4708*CL-.069
      T=TEMP(I,J)
      TSUM=(T-3.98)*(T-3.98)*(T+283.)
      TDENOM=503.57*(T+67.26)
      A=4.7867-98.185E-3*T+10.843E-4*T*T
      AT=A*T*1.E-3
      B=18.03-.8164*T+1.667E-2*T*T
      BT=B*T*1.E-6
      S1=(SIGO-.1324)*BT-AT+1.
      S2=SIGO+.1324
      SIGMAT(I,J)=TSUM/TDENOM+S1*S2
      WRITE (6,1400) I,J,SAL(I,J),TEMP(I,J),SIGMAT(I,J)
 1400 FORMAT (30X,2(I3,1X),3F12.3)
    2 CONTINUE
      RETURN
      END
```

```
C
C     LEAST SQUARES BEST FIT SOURCE CODE
C
C
      INTEGER ENDV
      REAL*8 NO3,PO4,SST,TITLE,XREG,YREG,DELX,DELY,SLOPE,B,XOBS,YOBS
      DIMENSION NO3(1000),PO4(1000),SST(1000),TITLE(10),XREG(1000),
     1YREG(1000),DELX(1000),DELY(1000),XOBS(1000),YOBS(1000)
      DATA NO3,PO4,SST,TITLE,XREG,YREG,DELX,DELY,XOBS,YOBS/1000*0.D0,
     11000*0.D0,1000*0.D0,10*' ',1000*0.D0,1000*0.D0,1000*0.D0,
     21000*0.D0,1000*0.D0,1000*0.D0/
C
      J=0
      DO 10 K=1,1000
      READ (5,100) ENDV,NO3(K),PO4(K),SST(K)
    1 IF (ENDV .EQ. 99) GO TO 20
    2 J=J+1
   10 CONTINUE
   20 L=1
      DO 30 K=1,J
      IF (NO3(K) .LE. 0.D0 .OR. SST(K) .LE. 0.D0) GO TO 30
   22 XOBS(L)=SST(K)
      YOBS(L)=NO3(K)
      L=L+1
   30 CONTINUE
      L=L-1
      READ (5,200) TITLE
      CALL NORLSQ (L,XOBS,YOBS,TITLE,XREG,YREG,DELX,DELY,SLOPE,B)
      CALL CORREL (L,XOBS,YOBS)
      L=1
      DO 40 K=1,J
      IF (PO4(K) .LE. 0.D0 .OR. SST(K) .LE. 0.D0) GO TO 40
   32 XOBS(L)=SST(K)
      YOBS(L)=PO4(K)
      L=L+1
   40 CONTINUE
      L=L-1
      READ (5,200) TITLE
      CALL NORLSQ (L,XOBS,YOBS,TITLE,XREG,YREG,DELX,DELY,SLOPE,B)
      CALL CORREL (L,XOBS,YOBS)
      L=1
      DO 50 K=1,J
      IF (PO4(K) .LE. 0.D0 .OR. SST(K) .LE. 0.D0 .OR. NO3(K) .LE. 0.D0)
     1 GO TO 50
   42 XOBS(L)=SST(K)
      YOBS(L)=NO3(K)/PO4(K)
      L=L+1
   50 CONTINUE
      L=L-1
      READ (5,200) TITLE
      CALL NORLSQ (L,XOBS,YOBS,TITLE,XREG,YREG,DELX,DELY,SLOPE,B)
      CALL CORREL (L,XOBS,YOBS)
      L=1
      DO 60 K=1,J
      IF (NO3(K) .LE. 0.D0 .OR. PO4(K) .LE. 0.D0) GO TO 60
   52 XOBS(L)=PO4(K)
      YOBS(L)=NO3(K)
      L=L+1
   60 CONTINUE
      L=L-1
      READ (5,200) TITLE
      CALL NORLSQ (L,XOBS,YOBS,TITLE,XREG,YREG,DELX,DELY,SLOPE,B)
      CALL CORREL (L,XOBS,YOBS)
  100 FORMAT (I2,3(F5.2,5X))
  200 FORMAT (10A8)
      STOP
      END
```

```
0001          SUBROUTINE CORREL (M,XOBS,YOBS)
0002          REAL*8 XOBS(1000),YOBS(1000),XYSUM,XSUM,YSUM,X2SUM,Y2SUM,A,B,C
0003          INTEGER*4 M
0004          XYSUM=0.000
0005          XSUM=0.000
0006          YSUM=0.000
0007          X2SUM=0.000
0008          Y2SUM=0.000
0009          DO 10 I=1,M
0010          XYSUM=XOBS(I)*YOBS(I)+XYSUM
0011          XSUM=XOBS(I)+XSUM
0012          YSUM=YOBS(I)+YSUM
0013          X2SUM=(XOBS(I)**2)+X2SUM
0014          Y2SUM=(YOBS(I)**2)+Y2SUM
0015       10 CONTINUE
0016          A=(DFLOAT(M)*X2SUM)-(XSUM**2)
0017          B=(DFLOAT(M)*Y2SUM)-(YSUM**2)
0018          C=(DFLOAT(M)*XYSUM)-(XSUM*YSUM)
0019          R=C/DSQRT(A*B)
0020          WRITE (6,20) R
0021       20 FORMAT (// 5X,'ESTIMATE OF THE POPULATION CORRELATION COEFFICIENT
             1= ',1PD24.14)
0022          RETURN
0023          END
```

```
C
C     GRAPHIC REPRESENTATION SOURCE DECK
C
C
      REAL DIST,NO3,PO4,RNOPO,SST
      DIMENSION DIST(1000),NO3(1000),PO4(1000),RNOPO(1000),SST(1000),
     1X(1000),Y(1000)
      DATA DIST,NO3,PO4,RNOPO,SST/1000*0.,1000*0.,1000*0.,1000*0.,
     11000*0./
      DATA X,Y/1000*0.,1000*0./
C
      J=0
      DO 10 K=1,1000
      READ (5,100) DIST(K),NO3(K),PO4(K),RNOPO(K),SST(K)
      IF (DIST(K) .EQ. 999.9) GO TO 11
    1 J=J+1
   10 CONTINUE
   11 READ (5,200) XMIN,XMAX
      DO 60 I=1,15
      CALL PLOTG(DIST,SST,J,1,1,3,
     1'ELAPSED DISTANCE (KM)',21,'NUTRIENTS (UM) / TEMPERATURE (DEG C)',
     236,XMIN,XMAX,0.,18.,21.,8.)
      DO 30 K=1,J
      Y(K)=(NO3(K)*.333)+8.
   30 CONTINUE
      CALL PLOTG (DIST,Y,J,2,1,1,
     1'ELAPSED DISTANCE (KM)',21,'NUTRIENTS (UM) / TEMPERATURE (DEG C)',
     236,XMIN,XMAX,0.,18.,21.,8.)
      DO 40 K=1,J
      Y(K)=(PO4(K)*3.333)+8.
   40 CONTINUE
      CALL PLOTG (DIST,Y,J,3,1,2,
     1'ELAPSED DISTANCE (KM)',21,'NUTRIENTS (UM) / TEMPERATURE (DEG C)',
     236,XMIN,XMAX,0.,18.,21.,8.)
      CALL PLOTG (DIST,SST,J,1,1,3,
     1'ELAPSED DISTANCE (KM)',21,'NUTRIENT RATIO (NO3/PO4) / TEMPERATURE
     2 (DEG C)',40,XMIN,XMAX,0.,18.,21.,8.)
      DO 50 K=1,J
      Y(K)=(RNOPO(K)*.666)+8.
   50 CONTINUE
      CALL PLOTG (DIST,Y,J,2,1,1,
     1'ELAPSED DISTANCE (KM)',21,'NUTRIENT RATIO (NO3/PO4) / TEMPERATURE
     2 (DEG C)',40,XMIN,XMAX,0.,18.,21.,8.)
      READ (5,200) XMIN,XMAX
      IF (XMIN .GT. DIST(J)) GO TO 61
   60 CONTINUE
   61 CALL PLOT (0.,0.,0.,0.,999)
  100 FORMAT (3(X,F5.1,2(2X,F5.2),2X,F4.1,17X,F5.2)
  200 FORMAT (2F5.1)
      STOP
      END
```

```
              C
              C      GRAPHIC REPRESENTATION OVER DEPTH SOURCE DECK
              C
              C
0001                 REAL NO3,N
0002                 DIMENSION DEPTH(7),SAL(7),TEMP(7),NO3(7),D(49),S(49),T(49),N(49)
0003                 DIMENSION ATP(7),X(7),Y(7),A(49),X1(49),Y1(49)
              C
0004                 L=1
0005                 DO 30 K=1,7
0006                 READ (5,200) DEPTH
0007                 READ (5,200) SAL
0008                 READ (5,200) TEMP
0009                 READ (5,200) NO3
0010                 READ (5,200) ATP
0011             200 FORMAT (7F8.3)
0012                 DO 10 J=1,7
0013                 SAL(J)=(SAL(J)-32.3)*5.
0014                 X(J)=-TEMP(J)
0015                 TEMP(J)=20.-((TEMP(J)-6.5)*1.205)
0016                 NO3(J)=((NO3(J)-.7)*.265)+20.
0017                 Y(J)=NO3(J)-10.
0018                 ATP(J)=40.-(ATP(J)*.055)
0019              10 CONTINUE
0020                 CALL PLOTG (DEPTH,SAL,7,1,1,5,
                    1'DEPTH (M)',5,
                    2'STATION      :  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
                    3 / ATP (NG/L)',78,0.,400.,0.,40.,6.,16.)
0021                 CALL PLOTG (DEPTH,TEMP,7,2,1,3,
                    1'DEPTH (M)',5,
                    2'STATION      :  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
                    3 / ATP (NG/L)',78,0.,400.,0.,40.,6.,16.)
0022                 CALL PLOTG (DEPTH,NO3,7,2,1,1,
                    1'DEPTH (M)',9,
                    2'STATION      :  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
                    3 / ATP (NG/L)',78,0.,400.,0.,40.,6.,16.)
0023                 CALL PLOTG (DEPTH,ATP,7,2,1,4,
                    1'DEPTH (M)',5,
                    2'STATION      :  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
                    3 / ATP (NG/L)',78,0.,400.,0.,40.,6.,16.)
0024                 CALL PLOTG (X,SAL,7,1,1,5,
                    1'TEMPERATURE (DEG C)',19,
                    2'STATION      :  SALINITY (PPT) / NITRATE (UM)',43,-15.,-6.,0.,20.,
                    36.,6.)
0025                 CALL PLOTG (X,Y,7,2,1,1,
                    1'TEMPERATURE (DEG C)',19,
                    2'STATION      :  SALINITY (PPT) / NITRATE (UM)',43,-15.,-6.,0.,20.,
                    36.,3.)
0026                 DO 20 I=1,7
0027                 D(L)=-DEPTH(I)
0028                 S(L)=SAL(I)
0029                 T(L)=TEMP(I)
0030                 N(L)=NO3(I)
0031                 A(L)=ATP(I)
0032                 X1(L)=X(I)
0033                 Y1(L)=Y(I)
0034                 L=L+1
0035              20 CONTINUE
0036              30 CONTINUE
0037                 L=1
0038              31 DO 40 K=1,7
0039                 DEPTH (K)=D(L)
0040                 SAL(K)=S(L)
0041                 TEMP(K)=T(L)
0042                 NO3(K)=N(L)
0043                 ATP(K)=A(L)
0044                 L=L+1
0045              40 CONTINUE
0046                 IF (L .NE. 8) GO TO 50
0047              41 CALL PLOTG (SAL,DEPTH,7,1,1,5,
                    1'  COMPOSITE:  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
                    2 / ATP (NG/L)',78,'DEPTH (M)',9,0.,40.,-400.,0.,40.,15.)
0048                 GO TO 60
```

```
0049        50 CALL PLOTG (SAL,DEPTH,7,2,1,5,
              1'  COMPOSITE:  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
              2 / ATP (NG/L)',78,'DEPTH (M)',9,0.,40.,-400.,0.,40.,15.)
0050        60 CALL PLOTG (TEMP,DEPTH,7,2,1,3,
              1'  COMPOSITE:  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
              2 / ATP (NG/L)',78,'DEPTH (M)',9,0.,40.,-400.,0.,40.,15.)
0051           CALL PLOTG (NO3,DEPTH,7,2,1,1,
              1'  COMPOSITE:  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
              2 / ATP (NG/L)',78,'DEPTH (M)',9,0.,40.,-400.,0.,40.,15.)
0052           CALL PLOTG (ATP,DEPTH,7,2,1,4,
              1'  COMPOSITE:  SALINITY (PPT) / TEMPERATURE (DEG C) / NITRATE (UM)
              2 / ATP (NG/L)',78,'DEPTH (M)',9,0.,40.,-400.,0.,40.,15.)
0053           IF (L .NE. 50) GO TO 31
0054        61 L=1
0055        62 DO 70 K=1,7
0056           X(K)=-X1(L)
0057           Y(K)=Y1(L)
0058           SAL(K)=S(L)
0059           L=L+1
0060        70 CONTINUE
0061           IF (L .NE. 8) GO TO 80
0062        71 CALL PLOTG (SAL,X,7,1,1,5,
              1'  COMPOSITE:  SALINITY (PPT) / NITRATE (UM)',43,
              2'TEMPERATURE (DEG C)',19,0.,20.,6.,15.,20.,15.)
0063           GO TO 90
0064        80 CALL PLOTG (SAL,X,7,2,1,5,
              1'  COMPOSITE:  SALINITY (PPT) / NITRATE (UM)',43,
              2'TEMPERATURE (DEG C)',19,0.,20.,6.,15.,20.,15.)
0065        90 CALL PLOTG (Y,X,7,2,1,1,
              1'  COMPOSITE:  SALINITY (PPT) / NITRATE (UM)',43,
              2'TEMPERATURE (DEG C)',19,0.,20.,6.,15.,20.,15.)
0066           IF (L .NE. 50) GO TO 62
0067        91 CALL PLOT (0.0,0.0,999)
0068           STOP
0069           END
```

```
                C
                C         CORRELATION PLOT SOURCE DECK
                C
                C
0001                  REAL DIST,NO3,PO4,KNOPO,SST
0002                  DIMENSION DIST(1000),NO3(1000),PO4(1000),KNOPO(1000),SST(1000),
                     1X(1000),Y(1000)
0003                  DATA DIST,NO3,PO4,KNOPO,SST/1000*0.,1000*0.,1000*0.,1000*0.,
                     11000*0./
0004                  DATA X,Y/1000*0.,1000*0./
                C
0005                  J=0
0006                  DO 10 K=1,1000
0007                  READ (5,100) DIST(K),NO3(K),PO4(K),KNOPO(K),SST(K)
0008                  IF (DIST(K) .EQ. 999.9) GO TO 11
0009            1     J=J+1
0010           10     CONTINUE
0011           11     XMAX=3.
0012                  YMAX=30.
0013                  L=1
0014                  DO 20 K=1,J
0015                  IF (KNOPO(K) .EQ. 0.) GO TO 20
0016           12     X(L)=PO4(K)
0017                  Y(L)=NO3(K)
0018                  L=L+1
0019           20     CONTINUE
0020                  L=L-1
0021                  CALL PLOTG (X,Y,L,1,0,1,'PHOSPHATE (UM)',14,'NITRATE (UM)',12,0.,
                     1XMAX,0.,YMAX,18.,18.)
0022                  XMIN=M.
0023                  XMAX=16.
0024                  L=1
0025                  DO 30 K=1,J
0026                  IF (NO3(K) .LE. 0. .OR. SST(K) .LE. 0.) GO TO 30
0027           21     Y(L)=NO3(K)
0028                  X(L)= SST(K)
0029                  L=L+1
0030           30     CONTINUE
0031                  L=L-1
0032                  CALL PLOTG (X,Y,L,1,0,1,
                     1'TEMPERATURE (DEG C)',15,'NITRATE (UM)',12,
                     2XMIN,XMAX,0.,YMAX,18.,18.)
0033                  YMAX=3.
0034                  L=1
0035                  DO 40 K=1,J
0036                  IF (PO4(K) .LE. 0. .OR. SST(K) .LE. 0.) GO TO 40
0037           31     Y(L)=PO4(K)
0038                  X(L)= SST(K)
0039                  L=L+1
0040           40     CONTINUE
0041                  L=L-1
0042                  CALL PLOTG (X,Y,L,1,0,1,
                     1'TEMPERATURE (DEG C)',15,'PHOSPHATE (UM)',14,
                     2XMIN,XMAX,0.,YMAX,18.,18.)
0043                  YMAX=15.
0044                  L=1
0045                  DO 50 K=1,J
0046                  IF (KNOPO(K) .LE. 0. .OR. SST(K) .LE. 0.) GO TO 50
0047           41     Y(L)=KNOPO(K)
0048                  X(L)= SST(K)
0049                  L=L+1
0050           50     CONTINUE
0051                  L=L-1
0052                  CALL PLOTG (X,Y,L,1,0,1,
                     1'TEMPERATURE (DEG C)',15,'NUTRIENT RATIO (NO3/PO4)',24,
                     2XMIN,XMAX,0.,YMAX,18.,18.)
0053                  CALL PLOT (0.,0.,0.0,999)
0054          100     FORMAT (31X,F5.1,2(2X,F5.2),2X,F4.1,17X,F5.2)
0055                  STOP
0056                  END
```

```
FORTRAN IV G LEVEL  21                MAIN                DATE = 80213         15/10/20              PAGE 0001

                    C
                    C      CONVERSION OF GEOGRAPHIC POSITIONS TO SIMPLE MATHEMATICAL SURFACE
                    C      MAXIMUM NUMBER OF POINTS ABLE TO BE PROCESSED = 1000
                    C
  0001                     REAL LLAT,MLAT,LLON,MLON,SPD(1250),M,D,Y(1250),X(1250)
  0002                     REAL ND3(1250),ND4(1250),MAGFLD(1250),ATP(1250),DPLA(1250)
  0003                     REAL SST(1250),XL(1250),YL(1250)
  0004                     REAL X1(1250),X2(1250),X3(1250),X4(1250)
  0005                     REAL Y1(1250),Y2(1250),Y3(1250),Y4(1250)
  0006                     REAL SPD1(1250),SPD2(1250),SPD3(1250),SPD4(1250)
  0007                     INTEGER TIME(1250),TIMD(1250)
  0008                     DIMENSION FLOCL(1250),DATA(1250)
  0009                     DATA X1,X2,X3,X4,Y1,Y2,Y3,Y4,SPD1,SPD2,SPD3,SPD4/
                          11250*0.,1250*0.,1250*0.,1250*0.,1250*0.,1250*0.,1250*0.,1250*0.,
                          21250*0.,1250*0.,1250*0.,1250*0./
                    C
                    C      READ GEO-POSITION DATA
                    C
  0010                     J=0
  0011                     DO 6 I=1,100
  0012                     READ (5,100) TIME(I),DLAT,MLAT,DLON,MLON,TIMD(I),SPD(I)
  0013                     IF (TIME(I) .EQ. 9999) GO TO 7
                    C
                    C      COMPUTE DISTANCE IN KILOMETERS FROM ORIGIN SPECIFIED
                    C
  0014                   1 D=DLAT-36.
  0015                     M=MLAT-0.0
  0016                     Y(I)=((D*60.)+M)*1.852
  0017                     D=DLON-122.
  0018                     M=MLON-2.
  0019                     X(I)=-((D*60.)+M)*1.4963
  0020                     J=J+1
                    C
                    C      OUTPUT GEO-POSITIONS AND X,Y COORDINATES
                    C
  0021                     WRITE (6,200) TIME(I),DLAT,MLAT,DLON,MLON,X(I),Y(I)
  0022                   6 CONTINUE
  0023                   7 J=J-1
                    C
                    C      COMPUTE DISTANCE BETWEEN KNOWN POINTS BY:
                    C            TIME-SPEED ALGORITHM
                    C            TRIGONOMETRIC ALGORITHM
                    C
  0024                     DO 4 I=1,J
  0025                     T=TIMD(I+1)-TIMD(I)
  0026                     D=T*SPD(I)*.020067
  0027                     A=X(I+1)-X(I)
  0028                     B=Y(I+1)-Y(I)
  0029                     C2=(A*A)+(B*B)
  0030                     C=SQRT(C2)
                    C
                    C      DEVELOP FACTOR TO LOCATE EACH DISTANCE SELECTIONS
                    C
  0031                     IF (D .NE. 0.) FLOCL(I)=C/D
                    C
                    C      COMPUTE ACUTE ANGLE FROM TRUE SOUTH TO NEXT KNOWN POINT
                    C
  0032                   2 AB=99.
                           IF (B .NE. 0.) AB=A/B
  0034                   3 DATA(I)=ATAN(AB)
  0035                   4 CONTINUE
  0036                     K=0
  0037                     L=0
                    C
                    C      READ THE DATA CARDS
                    C      STORE NUMBER OF DISCRETE SAMPLES READ UNDER BLOCK NO.
                    C      WHERE GEO-POSITION OF SAMPLE IS KNOWN APPLY ANGLE AND DISTANCE
                    C      FACTOR TO DATA ALONGTRACK TILL ANOTHER GEO-POSITION IS READ
                    C
  0038                     DO 14 I=1,1250
  0039                     READ (5,400) LIST,TIMEA,DIST,ND3(I),ND4(I),MAGFLD(I),ATP(I),
                          1DPLA(I),SST(I)
  0040                     IF (LIST .EQ. 99999) GO TO 15
```

```
0041            4 N=N+1
0042              IF (LLAT .EQ. 0.) GO TO 13
0043            5 L=L+1
0044              DNCLF=CNTR(L)
0045              CRIGIN=LIST
0046              XL(L)=X(L)
0047              YL(L)=Y(L)
0048              GO TO 14
          C
          C       FOR A POINT THAT IS NOT DEFINED BY C&D-POSITIONS
          C       COMPUTE DISTANCE FROM KNOWN POINT IN THE X- AND Y-DIRECTION
          C
0049           13 C=(DIST-DNCLF)*FLOCE(L)
0050              A=C*SIN(AN(L))
0051              B=C*COS(AN(L))
          C
          C       ADD INCREMENTAL DISTANCES TO LAST KNOWN POSITION TO ARRIVE AT
          C       X,Y COORDINATE OF SAMPLE
          C
0052              XL(I)=X(L)-A
0053              YL(I)=Y(L)-B
0054              IF (Y(L) .LT. Y(L+1)) XL(I)=X(L)+A
0055           17 IF (Y(L) .LT. Y(L+1)) YL(I)=Y(L)+B
0056           20 IF ((Y(L) .GE. Y(L+1)) .AND. (X(L) .LT. X(L+1))) XL(I)=X(L)+A
0057           14 CONTINUE
          C
          C       PUNCH ONLY SIGNIFICANT DATA AND X,Y COORDINATES
          C
0058           15 L=0
0059              L1=0
0060              L2=0
0061              L3=0
0062              L4=0
0063              DO 22 I=1,N
0064              IF (SS(I) .LE. 0.) GO TO 30
0065            9 L=L+1
0066              X(L)=XL(I)
0067              Y(L)=YL(I)
0068              SPC(L)=SS(I)
0069           30 IF (NC3(I) .LE. 0.1) GO TO 31
0070           10 L1=L1+1
0071              X1(L1)=XL(I)
0072              Y1(L1)=YL(I)
0073              SPC1(L1)=NC3(I)
0074           31 IF (C4(I) .LE. 0.1) GO TO 32
0075           11 L2=L2+1
0076              X2(L2)=XL(I)
0077              Y2(L2)=YL(I)
0078              SPC2(L2)=C4(I)
0079           32 IF (NCPC(I) .LE. 0.) GO TO 33
0080           12 L3=L3+1
0081              X3(L3)=XL(I)
0082              Y3(L3)=YL(I)
0083              SPC3(L3)=NCPC(I)
0084           33 IF (ATP(I) .LE. 0.) GO TO 22
0085           16 L4=L4+1
0086              X4(L4)=XL(I)
0087              Y4(L4)=YL(I)
0088              SPC4(L4)=ATP(I)
0089           22 CONTINUE
0090              WRITE (6,200) L,L1,L2,L3,L4
0091              DO 23 I=1,L
0092              WRITE (6,300) X(I),Y(I),SPC(I),X1(I),Y1(I),SPC1(I),
                 1X2(I),Y2(I),SPC2(I),X3(I),Y3(I),SPC3(I)
0093              WRITE (7,300) X(I),Y(I),SPC(I),X1(I),Y1(I),SPC1(I),
                 1X2(I),Y2(I),SPC2(I),X3(I),Y3(I),SPC3(I)
0094           23 CONTINUE
0095              DO 24 I=1,L4
0096              WRITE (6,700) X4(I),Y4(I),SPC4(I)
0097              WRITE (7,700) X4(I),Y4(I),SPC4(I)
0098           24 CONTINUE
          C
0099          100 FORMAT (I4,2X,2(2X,F4.1,F4.1),11X,I4,5X,F4.1)
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FORTRAN IV G LEVEL  21                MAIN              DATE = 80224        13/10/26             PAGE 0003

0100           200 FORMAT (5X,4(F5.2,F5.2))
0101           300 FORMAT (10X,I4,4(5X,F5.1),2(5X,F10.3))
0102           400 FORMAT (5X,F4.1,16X,I4,2X,F5.1,2(2X,F5.2),2X,F4.1,2X,F6.1,
                  12(2X,F5.2))
0103           500 FORMAT (//10X,5(I4,5X)//)
0104           600 FORMAT (4(2I3,3,F5.2))
0105           700 FORMAT (5X,2F7.3,F7.1)
             C
0106               STOP
0107               END


FORTRAN IV G LEVEL  21                MAIN              DATE = 80224        12/42/08             PAGE 0001

0001               REAL*8 TITLE(12),XAX/' X IN KM'/,YAX/' Y IN KM'/
0002               DIMENSION IE(35),CONTUR(30),NE(1),NA(10),X(500),Y(500),SPD(500)
0003               DATA IE/1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,
                  123,24,25,26,27,28,29,30,31,32,33,34,35/
0004               DATA NR,CF,XS,YS/1,.2,-6.3492,-6.3492/
0005               DATA NA/1,0,0,1,1,0,0,1,0,0/
0006               DATA TITLE/12*' '/
0007               READ (5,300) NE,NC
0008               READ (5,400) CONTUR
0009               L=0
0010               DO 1 I=1,500
0011               READ (5,200) X(I),Y(I),SPD(I)
0012               IF (X(I) .EQ. 999.9) GO TO 3
0013               WRITE (6,500) X(I),Y(I),SPD(I)
0014             2 L=L+1
0015             1 CONTINUE
0016             3 CALL CONISO(X,Y,SPD,L,IE,NR,NE,CONTUR,NC,CF,XS,YS,TITLE,XAX,
                  1YAX,NA,IER)
0017               WRITE (6,100) IER
0018           100 FORMAT (1CX,'CONISO ERROR CODE = ',I2)
0019           200 FORMAT (5X,2F7.3,F5.2)
0020           300 FORMAT (2I5)
0021           400 FORMAT (15F5.1/15F5.1)
0022           500 FORMAT (10X,2(F7.3,5X),F5.2)
0023               STOP
0024               END
```

```
                C
                C     10 MINUTE AVERAGED GRADIENTS OF NUTRIENTS/TEMPERATURE
                C     WITH RESPECT TO DISTANCE SEQUENCE DECK
                C
                C
0001                  REAL NO3,NN2
0002                  DIMENSION DIST(1000),NO3(1000),PO4(1000),SST(1000),DT(1000),
                     1DN(1000),DP(1000),DX(1000),DTDX(1000),DNDX(1000),DPDX(1000),
                     2ZERO(1000),CSUM(1000)
0003                  DIMENSION D(1000),B(1000),P(1000),T(1000)
0004                  DATA D,B,P,T/1000*0.,1000*0.,1000*0.,1000*0./
0005                  DO 1 I=1,1000
0006                  DIST(I)=0.
0007                  NO3(I)=0.
0008                  PO4(I)=0.
0009                  SST(I)=0.
0010                  DT(I)=-99.
0011                  DN(I)=-99.
0012                  DP(I)=-99.
0013                  DX(I)=-99.
0014                  DTDX(I)=-99.
0015                  DNDX(I)=-99.
0016                  DPDX(I)=-99.
0017                  ZERO(I)=0.
0018                  CSUM(I)=0.
0019                1 CONTINUE
                C
0020                  N=0
0021                  DO 2 I=1,1000
0022                  READ (5,100) D(I),B(I),P(I),T(I)
0023                  IF (D(I) .GE. 999.9) GO TO 3
0024              111 N=N+1
0025                2 CONTINUE
0026                3 N=N-4
0027                  DO 80 K=1,N
0028                  J=K
0029                  SUM1=0.
0030                  SUM2=0.
0031                  SUM3=0.
0032                  SUM4=0.
0033                  Z1=0.
0034                  Z2=0.
0035                  Z3=0.
0036                  DO 10 I=1,5
0037                  IF (T(J) .GT. 0.)    SUM1=SUM1+T(J)
0038                4 IF (B(J) .GT. 0.)    SUM2=SUM2+B(J)
0039                5 IF (P(J) .GT. 0.)    SUM3=SUM3+P(J)
0040                6 IF (T(J) .GT. 0.) Z1=Z1+1.
0041                7 IF (B(J) .GT. 0.) Z2=Z2+1.
0042                8 IF (P(J) .GT. 0.) Z3=Z3+1.
0043                9 SUM4=SUM4+D(J)
0044                  J=J+1
0045               10 CONTINUE
0046                  IF (Z1 .GT. 0.) SST(K)=SUM1/Z1
0047               77 IF (Z2 .GT. 0.) NO3(K)=SUM2/Z2
0048               78 IF (Z3 .GT. 0.) PO4(K)=SUM3/Z3
0049               79 DIST(K)=SUM4/5.
0050                  WRITE (7,600) DIST(K),SST(K),NO3(K),PO4(K)
0051               80 CONTINUE
0052                  M=N-1
0053                  DO 20 I=1,M
0054                  IF (SST(I+1) .GT. 0. .AND. SST(I) .GT. 0.)
                     1DT(I)=SST(I+1)-SST(I)
0055               14 IF (NO3(I+1) .GT. 0. .AND. NO3(I) .GT. 0.)
                     1DN(I)=NO3(I+1)-NO3(I)
0056               15 IF (PO4(I+1) .GT. 0. .AND. PO4(I) .GT. 0.)
                     1DP(I)=PO4(I+1)-PO4(I)
0057               16 DX(I)=DIST(I+1)-DIST(I)
0058                  IF (DX(I) .EQ. 0.) GO TO 20
0059               17 IF (DT(I) .NE. -99.) DTDX(I)=DT(I)/DX(I)
0060               18 IF (DN(I) .NE. -99.) DNDX(I)=DN(I)/DX(I)
0061               19 IF (DP(I) .NE. -99.) DPDX(I)=DP(I)/DX(I)
0062               20 CONTINUE
```

```
      YMAX=0.
      YMAX1=0.
      YMAX2=0.
      TMAX=0.
      AMAX=0.
      PMAX=0.
      CPMAX=0.
      DO 30 I=1,J
      IF (DTDX(I) .NE. -99.) YMAX1=ABS(DTDX(I))
   23 IF (DNDX(I) .NE. -99.) YMAX2=ABS(DNDX(I))
   24 IF (DPDX(I) .NE. -99.) CPMAX=ABS(DPDX(I))
   25 CYMAX=YMAX2
      IF(YMAX1 .GT. YMAX2) CYMAX=YMAX1
   26 IF (CYMAX .GT. YMAX) YMAX=CYMAX
   27 IF (CPMAX .GT. PMAX) PMAX=CPMAX
   28 IF (YMAX2 .GT. AMAX) AMAX=YMAX2
   29 IF (YMAX1 .GT. TMAX) TMAX=YMAX1
   30 CONTINUE
      WRITE (6,600)
      WRITE (6,300)
      WRITE (6,400) D(1),B(1),F(1),T(1)
      WRITE (6,400) D(2),B(2),F(2),T(2)
      WRITE (6,500) D(3),DIST(1),E(3),NO3(1),P(3),PO4(1),T(3),SST(1)
      M=N+2
      DO 60 I=4,M
      J=I-2
      K=I-3
      WRITE (6,200) D(I),DIST(J),DX(K),B(I),NO3(J),DN(K),P(I),PO4(J),
     1DF(K),T(I),SST(J),DT(K),DNDX(K),DPDX(K),DTDX(K)
   60 CONTINUE
      WRITE (6,400) D(N+3),E(N+3),F(N+3),T(N+3)
      WRITE (6,400) D(N+4),E(N+4),F(N+4),T(N+4)
      WRITE (6,700) TMAX,AMAX,PMAX
      J=N-1
      K=1
      L=1
      M=1
      DO 70 I=1,J
   64 IF (DTDX(I) .NE. -99.) CT(M)=DTDX(I)
   65 IF (DTDX(I) .NE. -99.) M=M+1
   66 IF (DNDX(I) .NE. -99.) CN(L)=DNDX(I)
   67 IF (DNDX(I) .NE. -99.) L=L+1
   68 IF (DPDX(I) .NE. -99.) CF(K)=DPDX(I)
   69 IF (DPDX(I) .NE. -99.) K=K+1
   70 CONTINUE
      K=K-1
      L=L-1
      M=M-1
      CALL HISTF (CT,M,20)
      CALL HISTF (CN,L,20)
      CALL HISTF (CF,K,20)
  100 FORMAT (31X,F5.1,2(2X,F5.2),23X,F5.2)
  200 FORMAT (/6X,15(F7.2,1X))
  300 FORMAT (6X,'DIST     DIST    D(DIST)     NO3      NO3   D(NO3)     PO4
     1      PO4   D(PO4)  TEMP      TEMP    D(TEMP)  DN/DX   DP/DX   DT/DX')
  400 FORMAT (/6X,4(F7.2,17X))
  500 FORMAT (/6X,4(2(F7.2,1X),8X))
  600 FORMAT (1H1,// '                  CRUISE (    )')
  700 FORMAT (// 8X,'MAXIMUM CHANGE IN TEMPERATURE FOR A ONE KILOMETER D
     1ISTANCE = ',F5.2 // 8X,'MAXIMUM CHANGE IN NITRATE FOR A ONE KILOME
     2TER DISTANCE = ',F5.2 // 8X,'MAXIMUM CHANGE IN PHOSPHATE FOR A ONE
     3 KILOMETER DISTANCE = ',F5.2)
  800 FORMAT (4F7.2)
      STOP
      END
```

```
              C
              C     FILTERED 10 MINUTE AVERAGED GRADIENTS OF NUTRIENTS/TEMPERATURE
              C     WITH RESPECT TO DISTANCE SOURCE CHECK
              C
              C
0001                REAL NO3,NPAR
0002                DIMENSION DIST(1000),NO3(1000),PO4(1000),SST(1000),DT(1000),
                   1DN(1000),DP(1000),DX(1000),DTDX(1000),DNDX(1000),DPDX(1000),
                   2ZERO(1000),CSUM(1000)
0003                DIMENSION D(1000),B(1000),P(1000),T(1000)
0004                DATA D,B,P,T/1000*0.,1000*0.,1000*0.,1000*0./
0005                DO 1 I=1,1000
0006                DIST(I)=0.
0007                NO3(I)=0.
0008                PO4(I)=0.
0009                SST(I)=0.
0010                DT(I)=-99.
0011                DN(I)=-99.
0012                DP(I)=-99.
0013                DX(I)=-99.
0014                DTDX(I)=-99.
0015                DNDX(I)=-99.
0016                DPDX(I)=-99.
0017                ZERO(I)=0.
0018                CSUM(I)=0.
0019              1 CONTINUE
              C
0020                N=0
0021                DO 2 I=1,1000
0022                READ (5,100) D(I),B(I),P(I),T(I)
0023                IF (D(I) .GE. 999.9) GO TO 3
0024            111 N=N+1
0025              2 CONTINUE
0026              3 N=N-4
0027                DO 80 K=1,N
0028                J=K
0029                SUM1=0.
0030                SUM2=0.
0031                SUM3=0.
0032                SUM4=0.
0033                Z1=0.
0034                Z2=0.
0035                Z3=0.
0036                DO 10 I=1,5
0037                IF (T(J) .GT. 0.)    SUM1=SUM1+T(J)
0038              4 IF (B(J) .GT. 0.)    SUM2=SUM2+B(J)
0039              5 IF (P(J) .GT. 0.)    SUM3=SUM3+P(J)
0040              6 IF (T(J) .GT. 0.) Z1=Z1+1.
0041              7 IF (B(J) .GT. 0.) Z2=Z2+1.
0042              8 IF (P(J) .GT. 0.) Z3=Z3+1.
0043              9 SUM4=SUM4+D(J)
0044                J=J+1
0045             10 CONTINUE
0046                IF (Z1 .GT. 0.) SST(K)=SUM1/Z1
0047             77 IF (Z2 .GT. 0.) NO3(K)=SUM2/Z2
0048             78 IF (Z3 .GT. 0.) PO4(K)=SUM3/Z3
0049             79 DIST(K)=SUM4/5.
0050             80 CONTINUE
0051                J=N-1
0052                DO 20 I=1,J
0053                IF (SST(I+1) .GT. 0. .AND. SST(I) .GT. 0.)
                   1DT(I)=SST(I+1)-SST(I)
0054             14 IF (NO3(I+1) .GT. 0. .AND. NO3(I) .GT. 0.)
                   1DN(I)=NO3(I+1)-NO3(I)
0055             15 IF (PO4(I+1) .GT. 0. .AND. PO4(I) .GT. 0.)
                   1DP(I)=PO4(I+1)-PO4(I)
0056             16 DX(I)=DIST(I+1)-DIST(I)
0057                IF (DX(I) .EQ. 0.) GO TO 20
0058             17 IF (DT(I) .NE. -99.) DTDX(I)=DT(I)/DX(I)
0059             18 IF (DN(I) .NE. -99.) DNDX(I)=DN(I)/DX(I)
0060             19 IF (DP(I) .NE. -99.) DPDX(I)=DP(I)/DX(I)
0061             20 CONTINUE
0062                READ (5,800) A1,A2,B1,B2,C1,C2
```

```
0063          WRITE (6,600)
0064          WRITE (6,200)
0065          WRITE (6,900) DIST(1)
0066          DO 90 I=1,J
0067          WRITE (6,900) DIST(I+1)
0068          IF ((DTDX(I) .LE. A2 .AND. DTDX(I) .GE. A1) .OR.
             1(DTDX(I) .EQ. -99.)) DTDX(I)=0.
0069       85 IF ((DNDX(I) .LE. B2 .AND. DNDX(I) .GE. B1) .OR.
             1(DNDX(I) .EQ. -99.)) DNDX(I)=0.
0070       86 IF ((DPDX(I) .LE. C2 .AND. DPDX(I) .GE. C1) .OR.
             1(DPDX(I) .EQ. -99.)) DPDX(I)=0.
0071       87 IF (DTDX(I) .NE. 0.) WRITE (6,300) DTDX(I)
0072       88 IF (DNDX(I) .NE. 0.) WRITE (6,400) DNDX(I)
0073       89 IF (DPDX(I) .NE. 0.) WRITE (6,500) DPDX(I)
0074       90 CONTINUE
0075          YMAX=0.
0076          YMAX1=0.
0077          YMAX2=0.
0078          TMAX=0.
0079          NMAX=0.
0080          PMAX=0.
0081          CPMAX=0.
0082          DO 30 I=1,J
0083          IF (DTDX(I) .NE. -99.) YMAX1=ABS(DTDX(I))
0084       23 IF (DNDX(I) .NE. -99.) YMAX2=ABS(DNDX(I))
0085       24 IF (DPDX(I) .NE. -99.) CPMAX=ABS(DPDX(I))
0086       25 CYMAX=YMAX2
0087          IF(YMAX1 .GT. YMAX2) CYMAX=YMAX1
0088       26 IF (CYMAX .GT. YMAX) YMAX=CYMAX
0089       27 IF (CPMAX .GT. PMAX) PMAX=CPMAX
0090       28 IF (YMAX2 .GT. NMAX) NMAX=YMAX2
0091       29 IF (YMAX1 .GT. TMAX) TMAX=YMAX1
0092       30 CONTINUE
0093          J=N-1
0094          DO 40 I=1,J
0095          TEMP=DTDX(I)*YMAX/TMAX
0096          DTDX(I)=TEMP
0097          TEMP=DNDX(I)*YMAX/NMAX
0098          DNDX(I)=TEMP
0099          IF (PMAX .GT. 0.) TEMP=DPDX(I)*YMAX/PMAX
0100       32 IF (PMAX .LE. 0.) TEMP=DPDX(I)
0101       33 DPDX(I)=TEMP
0102          DSUM(I)=DIST(I)+(DX(I)/2.)
0103       40 CONTINUE
0104          YMIN=-YMAX
0105          READ (5,700) XMIN,XMAX
0106          DO 50 I=1,15
0107          CALL PLOTG (DSUM,DTDX,J,1,1,1,
             1'ELAPSED DISTANCE (KM)',21,'GRADIENTS OF NUTRIENTS & TEMPERATURE O
             2VER DISTANCE',50,XMIN,XMAX,YMIN,YMAX,21.,8.)
0108          CALL PLOTG (DSUM,DNDX,J,2,1,1,
             1'ELAPSED DISTANCE (KM)',21,'GRADIENTS OF NUTRIENTS & TEMPERATURE O
             2VER DISTANCE',50,XMIN,XMAX,YMIN,YMAX,21.,8.)
0109          CALL PLOTG (DSUM,DPDX,J,3,2,2,
             1'ELAPSED DISTANCE (KM)',21,'GRADIENTS OF NUTRIENTS & TEMPERATURE O
             2VER DISTANCE',50,XMIN,XMAX,YMIN,YMAX,21.,8.)
0110          CALL PLOTG (DIST,ZERO,N,3,1,0,
             1'ELAPSED DISTANCE (KM)',21,'GRADIENTS OF NUTRIENTS & TEMPERATURE O
             2VER DISTANCE',50,XMIN,XMAX,YMIN,YMAX,21.,8.)
0111          READ (5,700) XMIN,XMAX
0112          IF (XMIN .GT. DIST(N)) GO TO 51
0113       50 CONTINUE
0114       51 CALL PLOT (0.,0.,0.0,999)
0115      100 FORMAT (31X,F5.1,2(2X,F5.2),23X,F5.2)
0116      200 FORMAT (// 52X,'DIST',T61,'DT/DX    DN/DX    DP/DX'//)
0117      300 FORMAT ('+',T59,F7.2)
0118      400 FORMAT ('+',T67,F7.2)
0119      500 FORMAT ('+',T75,F7.2)
0120      600 FORMAT (1H1,//'                CRUISE (    )')
0121      700 FORMAT (2F5.1)
0122      800 FORMAT (6F7.4)
0123      900 FORMAT (/ 50X,F7.2)
0124          STOP
```

BIBLIOGRAPHY

Anonymous, Technicon Industrial Systems Technical Publication No. TA 1-0170-20, Operational Manual for the Technicon Auto Analyzer II System, 1972.

Anonymous, Technicon Industrial Systems Industrial Method No. 177-72-WM, Ortho Phosphate in Water and Seawater, January 1973.

Anonymous, Technicon Industrial Systems Industrial Method No. 100-70-W/B, Nitrate and Nitrite in Water and Waste Water, January 1978.

Barber, R.T., A Comparison of the Biological Productivity in Several Coastal Upwelling Regions, paper presented at IDOE International Symposium on Coastal Upwelling, Los Angeles, California, 4 February 1980.

Blasco, D., Phytoplankton Strategies in the Upwelling Regions, paper presented at IDOE International Symposium on Coastal Upwelling, Los Angeles, California, 5 February 1980.

Boyd, C.M., and Smith, S.L., Interaction of Plankton Populations in the Surface Waters of the Peruvian Upwelling Region: A Study in Mapping, paper presented at IDOE Symposium on Coastal Upwelling, Los Angeles, California, 5 February 1980.

Bronsink, S.H., Microplanktonic ATP - Biomass and GTP - Productivity Associated with Upwelling off Point Sur, California, Master's Thesis, Naval Postgraduate School, Monterey, 1980.

Conrad, J.W., Relationships Between Sea Surface Temperature and Nutrients in Satellite Detected Oceanic Fronts, Master's Thesis, Naval Postgraduate School, Monterey, 1980.

James, R.W., Ocean Thermal Structure Forecasting, SP-105 Antisubmarine Warfare Environmental Prediction Services, V. 5, p. 74-133, 1966.

Johnson, J.E., Subsurface Dynamical Properties of Variable Features Seen in Satellite IR Imagery off Point Sur and Their Acoustic Significance, Master's Thesis, Naval Postgraduate School, Monterey, 1980.

Maul, G.A., and Sidran, M., "Atmospheric Effects on Ocean Surface Temperature Sensing from the NOAA Satellite Scanning Radiometer," Journal of Geophysical Research, V. 78(12), p. 1909, 1973.

Paulson, G.P., A Study of Nutrient Variations in the Surface and Mixed Layer of Monterey Bay Using Automatic Analysis Techniques, Master's Thesis, Naval Postgraduate School, Monterey, 1972.

Traganza, E.D., Nestor, D.A., and McDonald, A.K., "Satellite Observations of a Nutrient Upwelling off the Coast of California," Journal of Geophysical Research, V. 85(C7), p. 4101-4106, 1980.

Traganza, E.D., Conrad, J.W., and Breaker, L.C., "Satellite Observations of a 'Cyclonic Upwelling System' and 'Giant Plume' in the California Current," (in press Journal of Geophysical Research), 1980.

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